

2006 Buick Lucerne CXS

2006 ACCESSORIES & EQUIPMENT Instrument Panel, Gages and Console - Lucerne

2006 ACCESSORIES & EQUIPMENT**Instrument Panel, Gages and Console - Lucerne****SPECIFICATIONS****FASTENER TIGHTENING SPECIFICATIONS****Fastener Tightening Specifications**

Application	Specification	
	Metric	English
Front Floor Console Armrest Cover Screws	2 N.m	18 lb in
Front Floor Console Armrest Hinge Screws	2 N.m	18 lb in
Front Floor Console Armrest Lower Latch Cover Screws	2 N.m	18 lb in
Front Floor Console Armrest Screws	2 N.m	18 lb in
Front Floor Console Ashtray Bolts	2 N.m	18 lb in
Front Floor Console Bolts	9 N.m	80 lb in
Front Floor Console Cupholder Screws	2 N.m	18 lb in
Front Floor Console Screws	2 N.m	18 lb in
Front Floor Console Shift Bezel Bolts	2 N.m	18 lb in
Instrument Panel Ashtray Assembly Screws	2 N.m	18 lb in
Instrument Panel Carrier Bolts/Nuts	25 N.m	18 lb ft
Instrument Panel Cluster Assembly Screws	2 N.m	18 lb in
Instrument Panel Compartment Latch Screws	2 N.m	18 lb in
Instrument Panel Compartment Screws	2 N.m	18 lb in
Instrument Panel Compartment Striker Screws	2 N.m	18 lb in
Instrument Panel Lower Trim Panel Bolts	9 N.m	80 lb in
Instrument Panel Trim Plate Screws	2 N.m	18 lb in
Instrument Panel Upper Trim Pad Bolts	9 N.m	80 lb in
Knee Bolster Screws	2 N.m	18 lb in

FUEL LEVEL SPECIFICATIONS

The information in this table is intended for use with the **J 33431-C** Signal Generator and Instrument Panel Tester. See **Special Tools**. The fuel level sensor values represent the test values to be used on the Signal Generator to drive the fuel gage display to the indicated positions. Vehicles that require more than one fuel level sensor calculate gage position from many possible resistance combinations of fuel levels between the two tanks. Therefore, the values in the table may not correlate directly to readings taken from the vehicle primary or secondary sending units.

The values in the table are approximate values based on information obtained from properly operating vehicles. Actual results may vary slightly.

Fuel Level Specifications

Fuel Gauge Display	Resistance	Fuel Level	Fuel Remaining
E	205-250 ohm	0-9%	2.3 V
1/4	169 ohm	20%	2.0 V
1/2	129 ohm	42%	1.7 V
3/4	84 ohm	67%	1.3 V
F	48-40 ohm	90-100%	0.8 V

SCHEMATIC AND ROUTING DIAGRAMS

INSTRUMENT CLUSTER SCHEMATICS

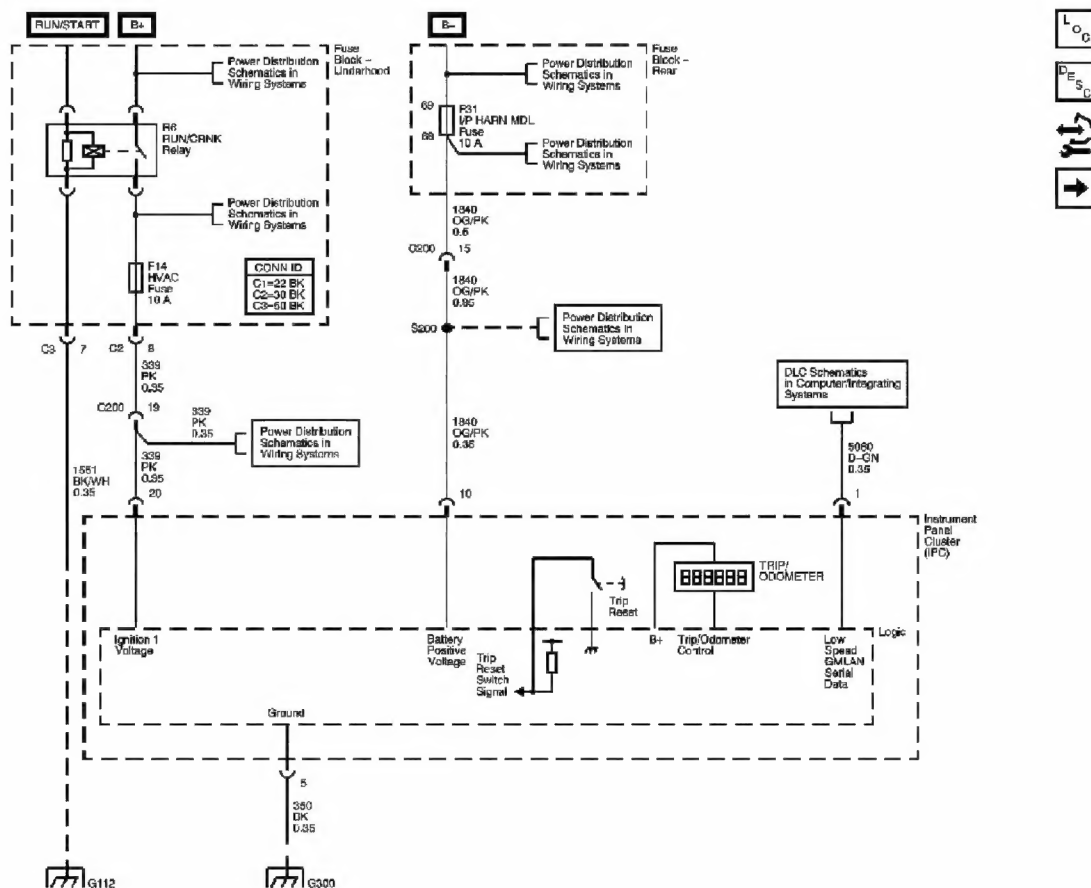


Fig. 1: Power & Ground Schematic
Courtesy of GENERAL MOTORS CORP.

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Fig. 2: Indicators Schematic

Courtesy of GENERAL MOTORS CORP.

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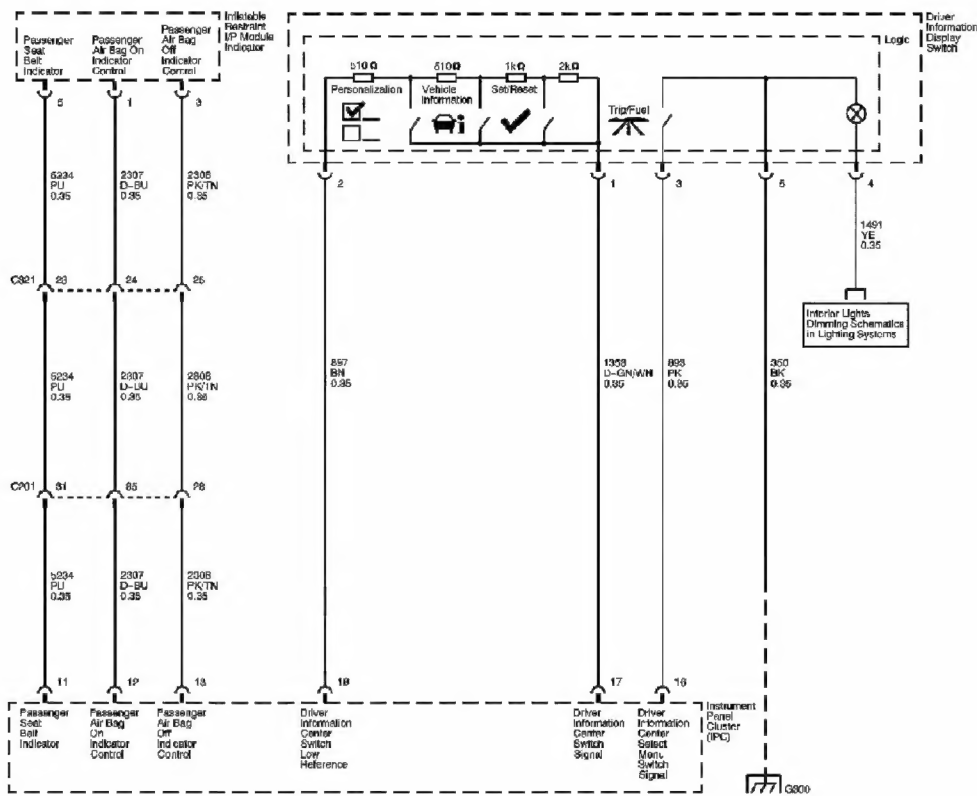


Fig. 3: Inflatable Restraint Indicator & Driver Information Display Schematic
Courtesy of GENERAL MOTORS CORP.

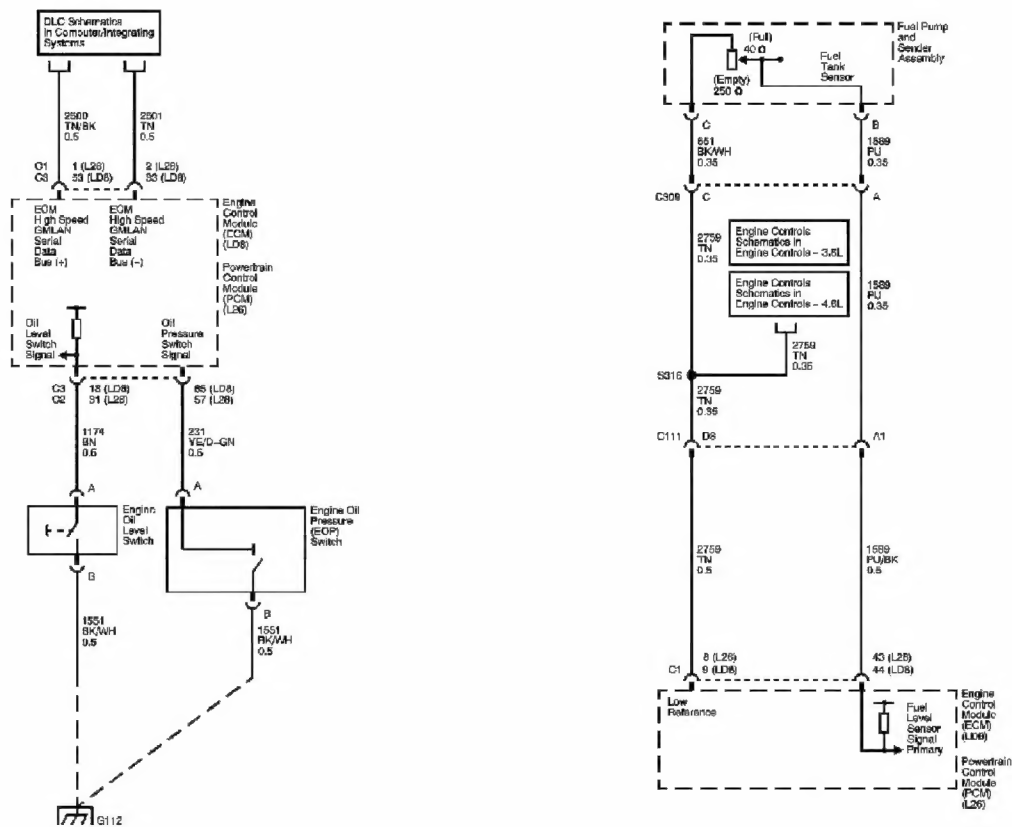


Fig. 4: Oil Level, EOP & Fuel Level Sensor Schematic
Courtesy of GENERAL MOTORS CORP.

AUDIBLE WARNINGS SCHEMATICS

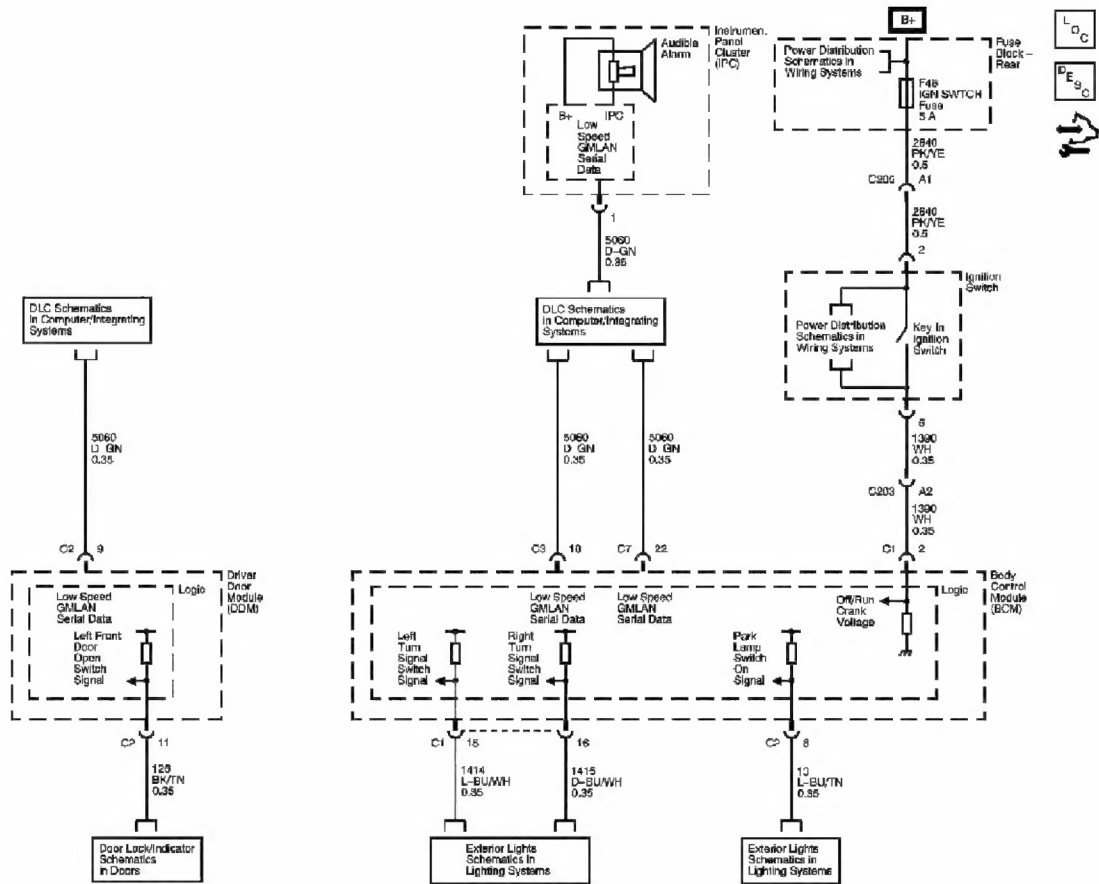


Fig. 5: Audible Warnings Schematic
Courtesy of GENERAL MOTORS CORP.

COMPONENT LOCATOR

INSTRUMENT PANEL, GAGES AND CONSOLE COMPONENT VIEWS

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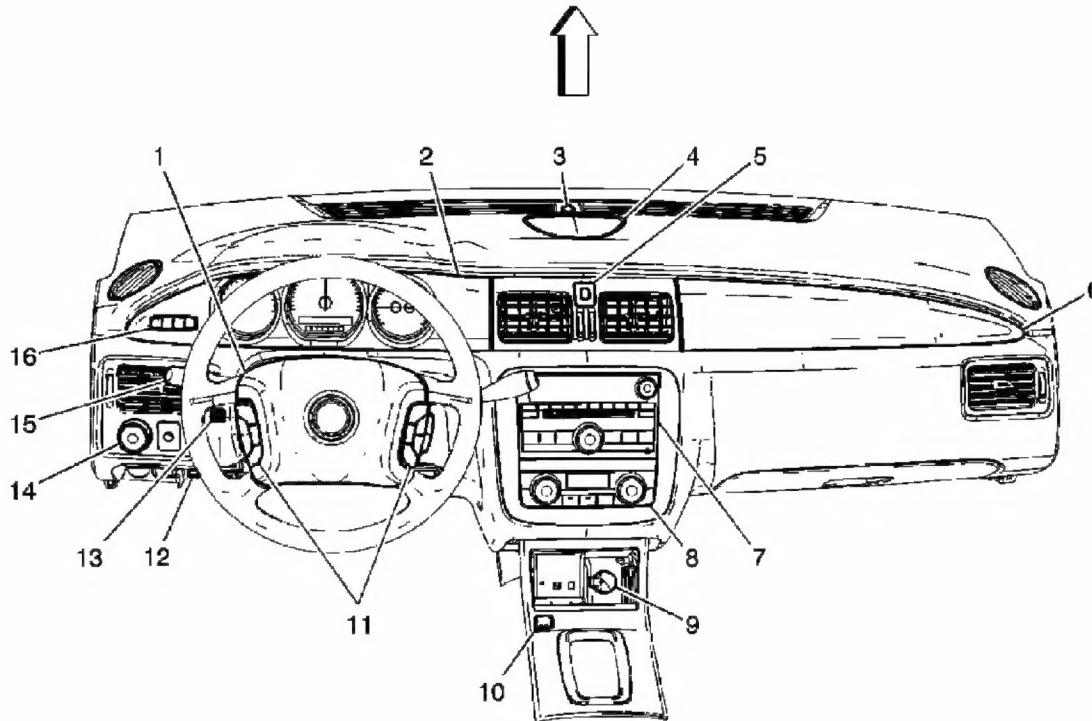


Fig. 6: View Of Instrument Panel (I/P) Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 6

Callout	Component Name
1	Inflatable Restraint Steering Wheel Module
2	Instrument Panel Cluster (IPC)
3	Sunload Twilight Sensor
4	Speaker - Front Center (UQA)
5	Hazard Switch
6	Inflatable Restraint I/P Module
7	Radio
8	HVAC Control Module
9	Auxiliary Power Outlet - Console (A51)/Cigar Lighter (DT4 w/A51)
10	Traction Control Switch
11	Steering Wheel Controls
12	Data Link Connector (DLC)
13	Air Temperature Sensor - Inside (CJ2)
14	Headlamp Switch
15	Turn Signal/Multifunction Switch
16	Driver Information Display Switch

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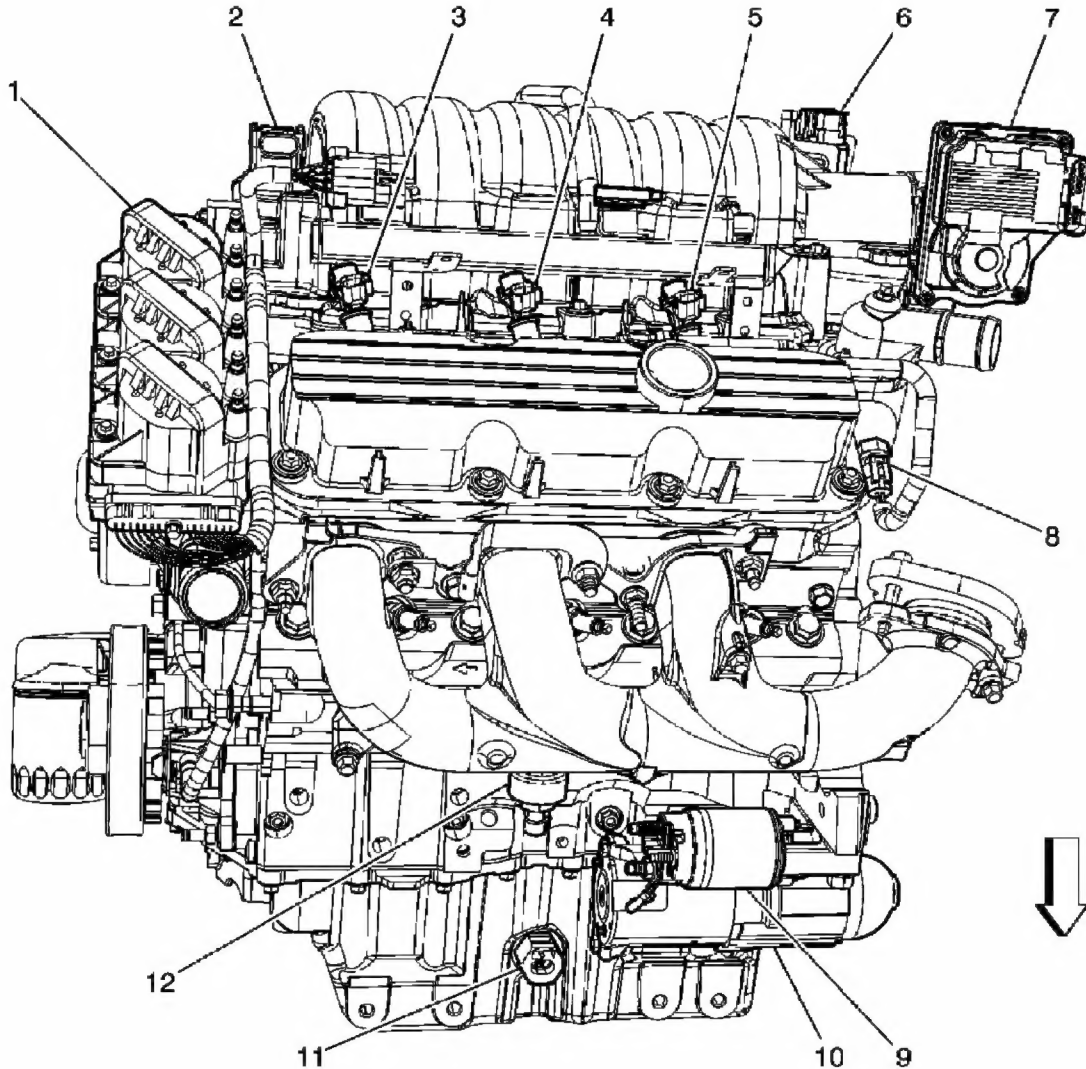


Fig. 7: View Of Front Of Engine (L26)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 7

Callout	Component Name
1	Ignition Coil Module
2	Manifold Absolute Pressure (MAP) Sensor
3	Fuel Injector 1
4	Fuel Injector 3
5	Fuel Injector 5
6	Exhaust Gas Recirculation (EGR) Valve
7	Throttle Actuator Control (TAC) Module
8	Engine Coolant Temperature (ECT) Sensor
9	Starter Solenoid

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Callout	Starter	Component Name
11	Engine Oil Life Monitor Switch	
12	Manifold Absolute Pressure (MAP) Sensor	

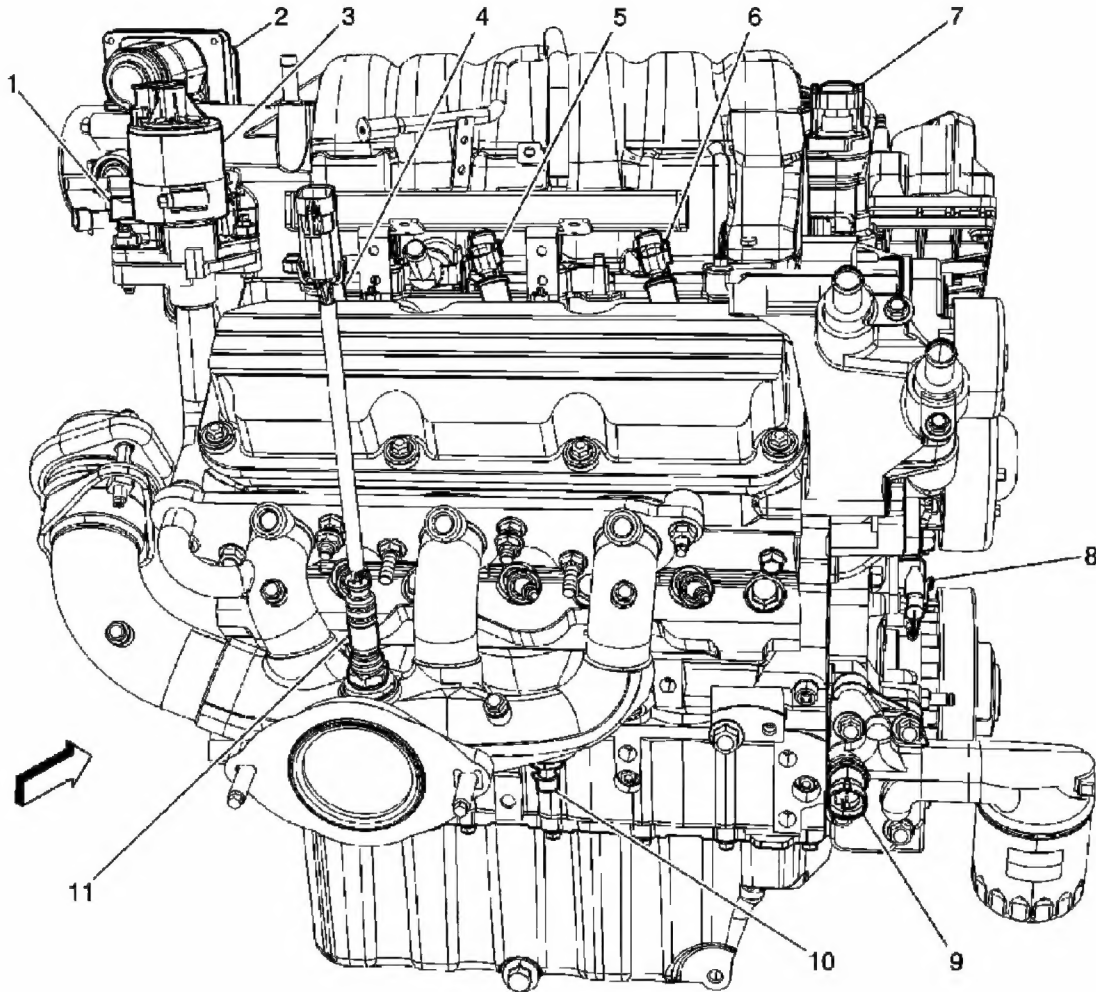


Fig. 8: View Of Rear Of Engine (L26)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 8

Callout	Component Name
1	Evaporative Emission (EVAP) Canister Purge Solenoid Valve
2	Throttle Actuator Control (TAC) Module
3	Exhaust Gas Recirculation (EGR) Valve
4	Fuel Injector 6
5	Fuel Injector 4
6	Fuel Injector 2
7	Manifold Absolute Pressure (MAP) Sensor
8	Throttle Cable
9	Throttle Position Sensor
10	Throttle Body
11	Engine Oil Life Monitor Switch

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- | | |
|----|----------------------------------|
| 8 | Camshaft Position (CMP) Sensor |
| 9 | Engine Oil Pressure (EOP) Sensor |
| 10 | Knock Sensor (KS) 2 |
| 11 | Heated Oxygen Sensor (HO2S) 1 |

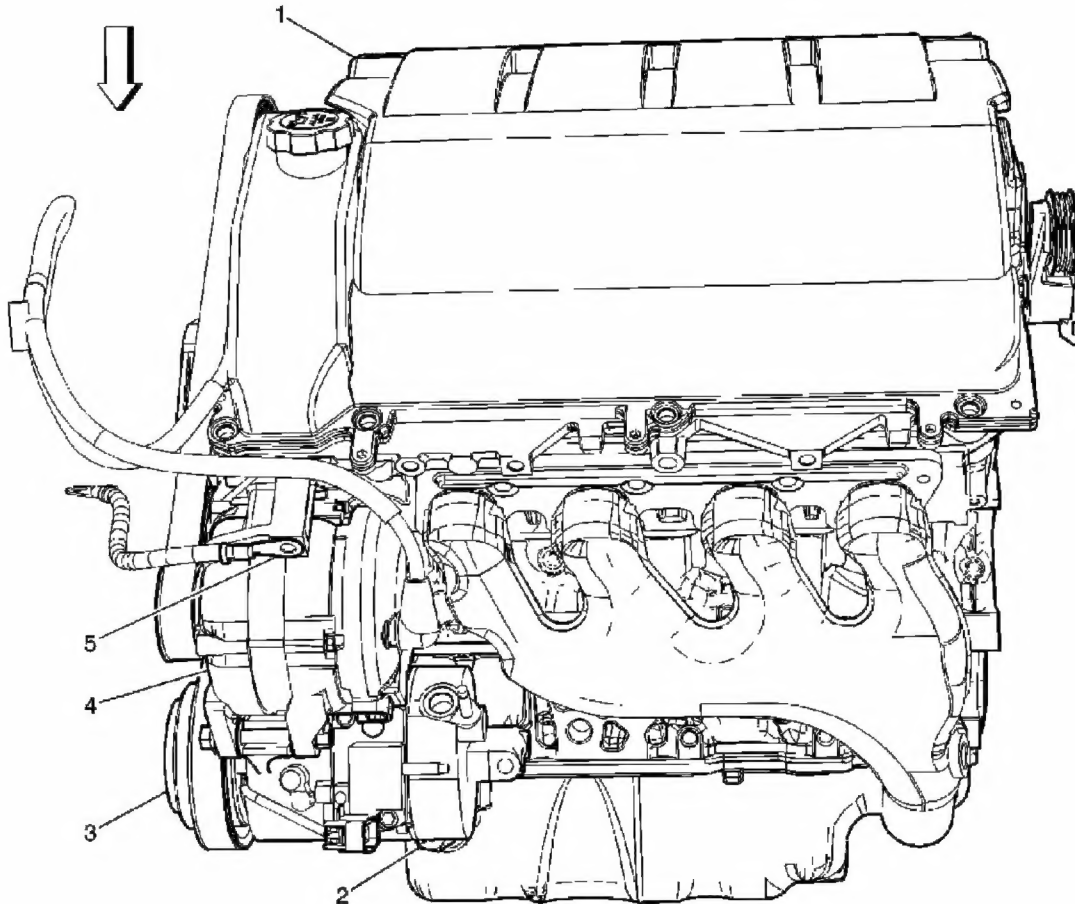


Fig. 9: View Of Left Side Of Engine (4.6L)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 9

Callout	Component Name
1	Engine - 4.6L
2	Engine Oil Level Switch (06)
3	A/C Compressor
4	Generator
5	G110

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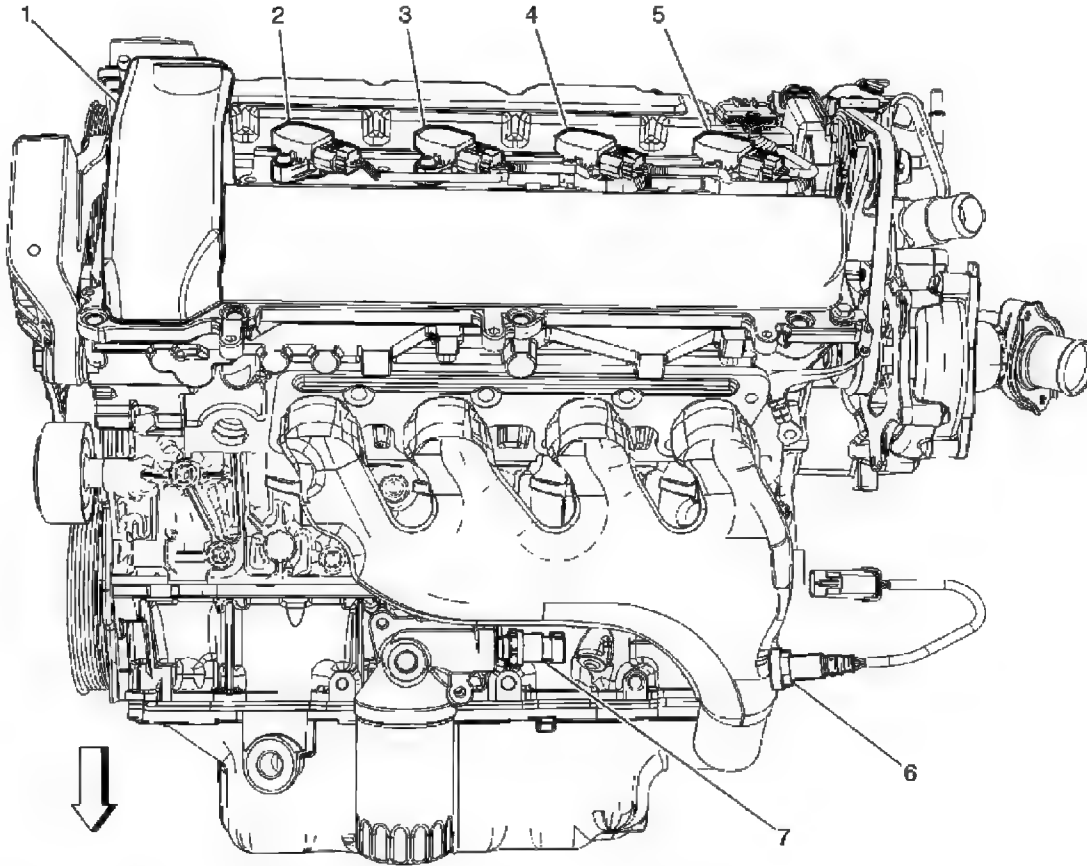


Fig. 10: View Of FRONT OF Engine (L37/LD8)
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 10

Callout	Component Name
1	Valve Cover
2	Ignition Coil/Module 2
3	Ignition Coil/Module 4
4	Ignition Coil/Module 6
5	Ignition Coil/Module 8
6	Heated Oxygen Sensor (HO2S) Bank 2 Sensor 1
7	Engine Oil Pressure (EOP) Switch

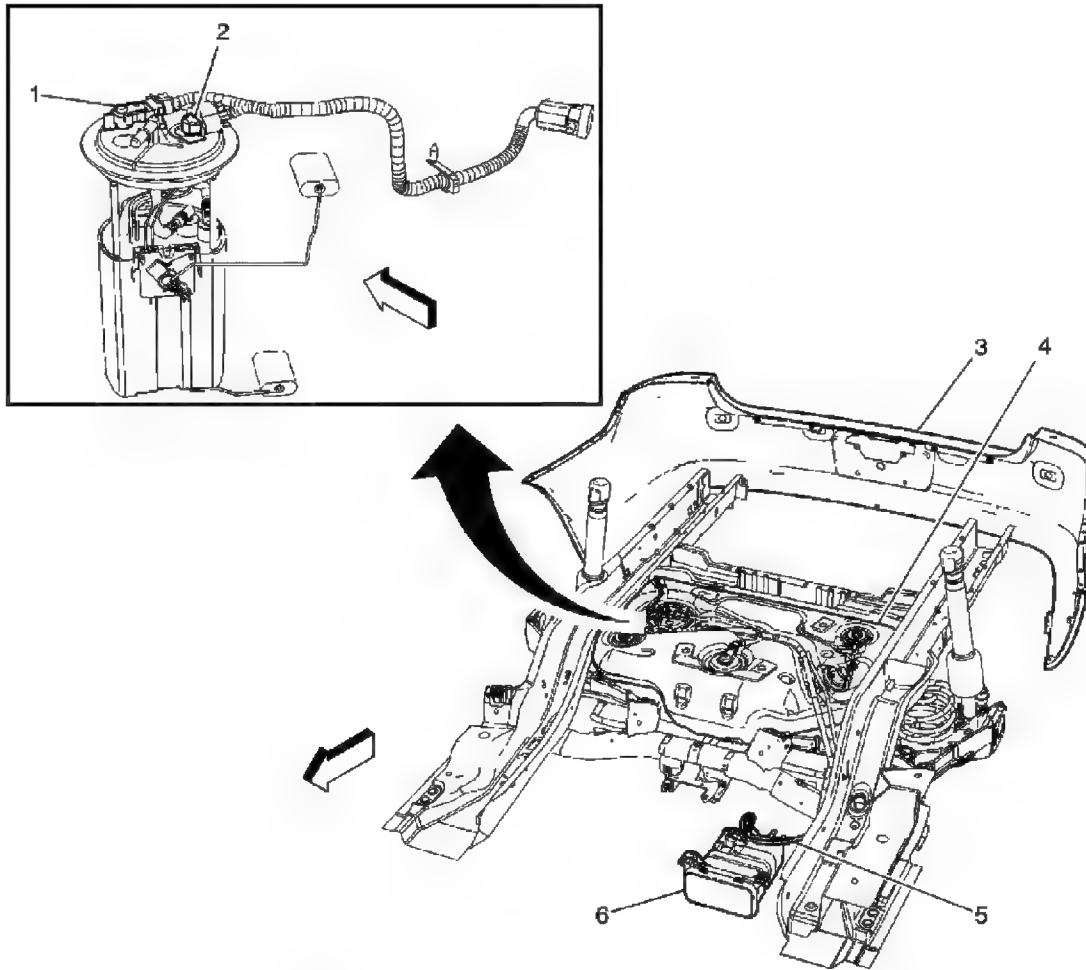


Fig. 11: Identifying Fuel Tank Components
Courtesy of GENERAL MOTORS CORP.

Callouts For Fig. 11

Callout	Component Name
1	Fuel Tank Pressure (FTP) Sensor Connector
2	Fuel Pump and Sender Assembly
3	Rear Fascia
4	Fuel Tank
5	Body Harness
6	Evaporative Emission (EVAP) Canister Vent Solenoid Valve

INSTRUMENT PANEL, GAGES AND CONSOLE CONNECTOR END VIEWS

Driver Information Display Switch

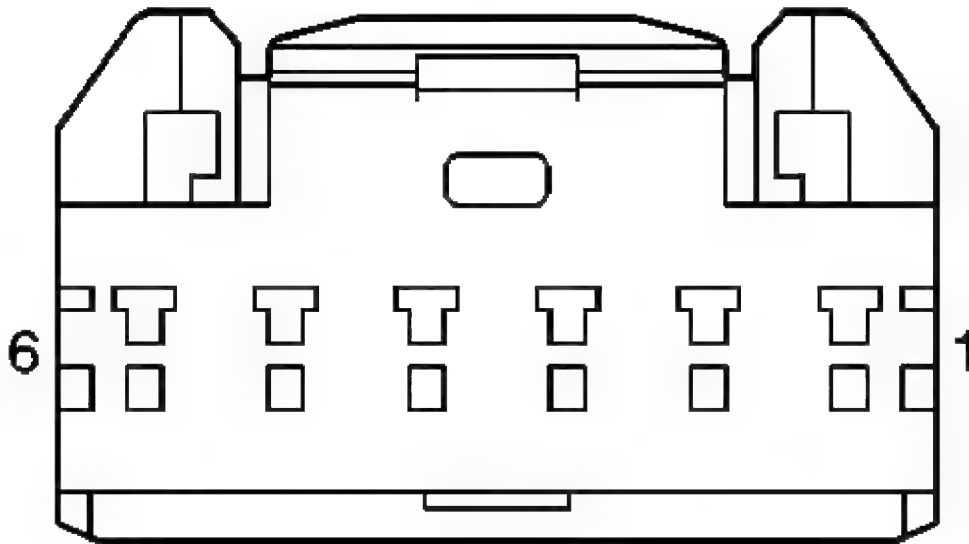


Fig. 12: Driver Information Display Switch Connector End View
 Courtesy of GENERAL MOTORS CORP.

Instrument Panel, Gages and Console Connector End Views

Connector Part Information

- OEM: HCMPB-06-K
- Service: See Catalog
- Description: 6-Way F (BK)

Terminal Part Information

- Pins: 1, 2, 3, 4, 5
- Terminal/Tray: SHCM-A03T-P025/20
- Core/Insulation Crimp: J/J
- Release Tool/Test Probe: 12094429/J-35616-64B (L-BU)

Driver Information Display Switch

Pin	Wire Color	Circuit No.	Function
1	D-GN/WH	1358	Driver Information Center Switch Signal
2	BN	897	Driver Information Center Switch

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3	PK	893	Low Reference
4	YE	1491	Driver Information Center Select
5	BK	350	Menu Switch Signal
6	-	-	Backlight Lamp Control
			Ground
			Not Used

Engine Oil Level Switch

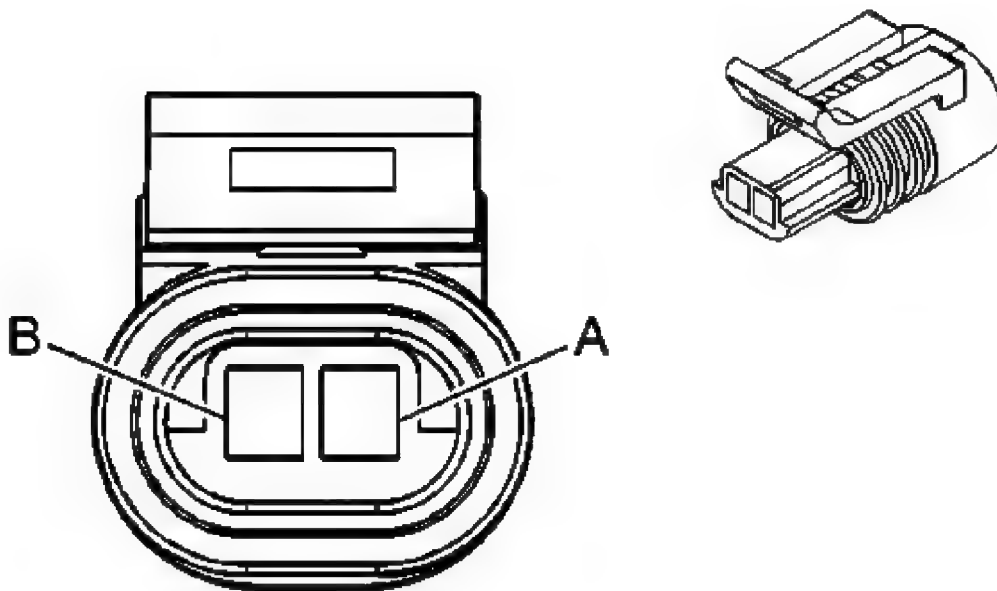


Fig. 13: Engine Oil Level Switch Connector End View
Courtesy of GENERAL MOTORS CORP.

Instrument Panel, Gages and Console Connector End Views

Connector Part Information

- OEM: 12162195
- Service: 88987993
- Description: 2-Way F Metri-Pack 150.2 Series, Sealed, Pull To Seat (BK)

Terminal Part Information

- Pins: A
- Terminal/Tray: 12124075/5

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- Core/Insulation Crimp: E/C
- Release Tool/Test Probe: 12180559-1/J-35616-2A (GY)
- Pins: B
- Terminal/Tray: See Terminal Repair Kit
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool/Test Probe: See Terminal Repair Kit

Engine Oil Level Switch

Pin	Wire Color	Circuit No.	Function
A	BN	1174	Oil Level Switch Signal
B	BK/WH	1551	Ground

Engine Oil Pressure (EOP) Switch

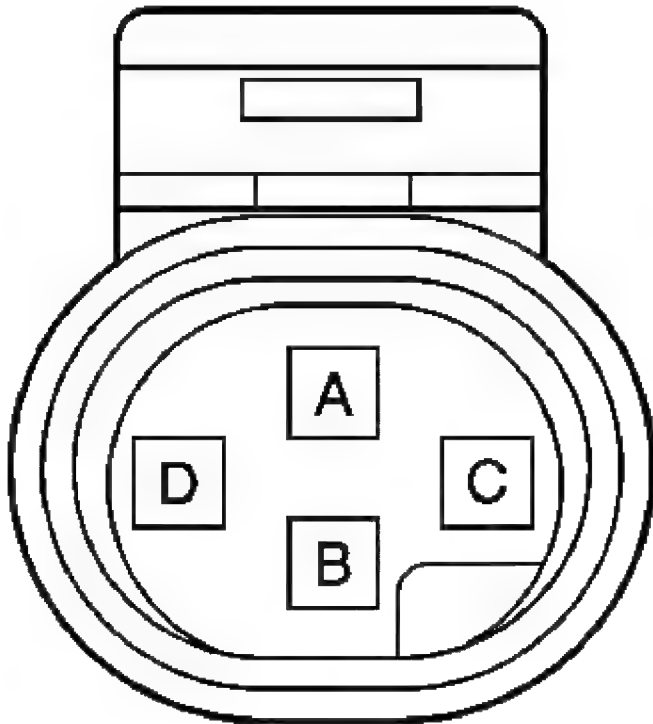


Fig. 14: Engine Oil Pressure (EOP) Switch Connector End View
Courtesy of GENERAL MOTORS CORP.

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Instrument Panel, Gages and Console Connector End Views

Connector Part Information

- OEM: 12065298
- Service: 12085539
- Description: 4-Way F Metri-Pack 150 Series (BK)

Terminal Part Information

- Pins: A, B
- Terminal/Tray: 12048074/2
- Core/Insulation Crimp: E/1
- Release Tool/Test Probe: 12094429/J-35616-2A (GY)

Engine Oil Pressure (EOP) Switch

Pin	Wire Color	Circuit No.	Function
A	YE/D-GN	231	Oil Pressure Switch Signal
B	BK/WH	1551	Ground
C-D	-	-	Not Used

Instrument Panel Cluster (IPC)

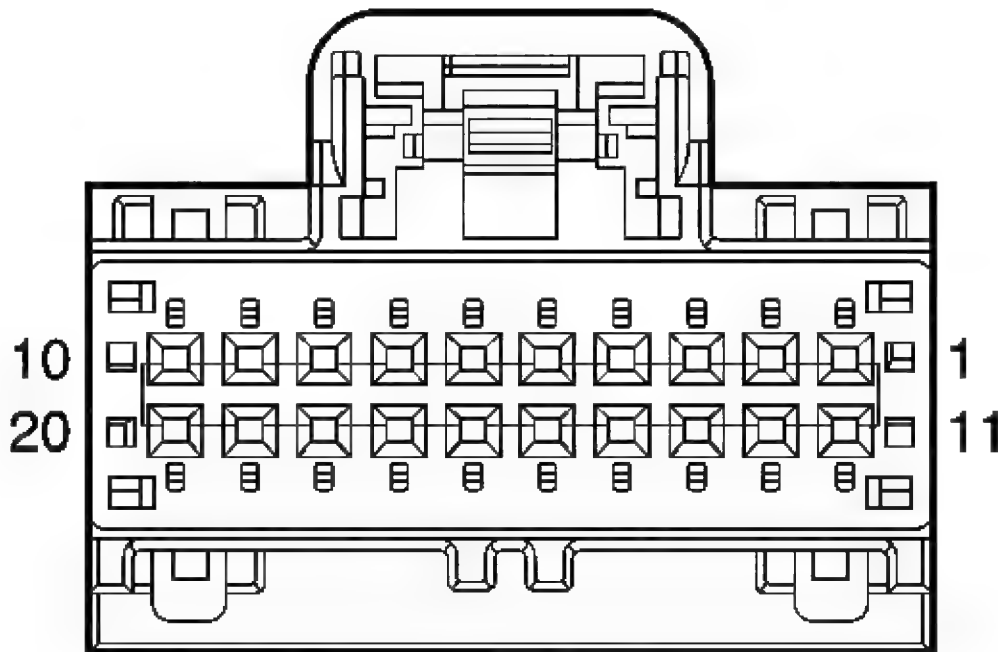


Fig. 15: Instrument Panel Cluster (IPC) Connector End View
Courtesy of GENERAL MOTORS CORP.

Instrument Panel, Gages and Console Connector End Views

Connector Part Information

- OEM: 31410-1200
- Service: 88987996
- Description: 20-Way F (BK)

Terminal Part Information

- Terminal/Tray: See Terminal Repair Kit
- Core/Insulation Crimp: See Terminal Repair Kit
- Release Tool/Test Probe: See Terminal Repair Kit

Instrument Panel Cluster (IPC)

Pin	Wire Color	Circuit No.	Function
1-2	D-GN	5060	Low Speed GMLAN Serial Data
3	-	-	Not Used

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4	BN/WH	419	MIL Control
5-6	BK	350	Ground
7	-	-	Not Used
8	GY	8	Instrument Panel Lamp Supply Voltage
9	-	-	Not Used
10	OG/PK	1840	Battery Positive Voltage
11	PU	5234	Passenger Seat Belt Indicator
12	D-BU	2307	Passenger Air Bag On Indicator Control
13	PK/TN	2308	Passenger Air Bag Off Indicator Control
14	TN	185	Low Washer Fluid Indicator Signal
15	TN/WH	33	Brake Warning Indicator Control
16	PK	893	Driver Information Center Select Menu Switch Signal
17	D-GN/WH	1358	Driver Information Center Switch Signal
18	BN	897	Driver Information Center Switch Low Reference
19	D-BU/WH	5970	Heated Washer Fluid Indicator Control (XA7)
20	PK	339	Ignition 1 Voltage

DIAGNOSTIC INFORMATION AND PROCEDURES**DIAGNOSTIC CODE INDEX****DIAGNOSTIC CODE INDEX**

DTC	Description
<u>DTC B0158</u>	** DESCRIPTION NOT COLLECTED **
<u>DTC B3567</u>	**DESCRIPTION NOT COLLECTED **
<u>DTC P0461</u>	**DESCRIPTION NOT COLLECTED **
<u>DTC P0462</u>	**DESCRIPTION NOT COLLECTED **
<u>DTC P0463</u>	**DESCRIPTION NOT COLLECTED **
<u>DTC P0464</u>	Fuel Level Sensor Circuit Intermittent
<u>DTC P0520</u>	**DESCRIPTION NOT COLLECTED **

DIAGNOSTIC STARTING POINT - INSTRUMENT PANEL, GAGES AND CONSOLE

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Begin the instrument panel (I/P) system diagnosis with the appropriate Diagnostic System Check - Vehicle. Refer to **Diagnostic System Check - Vehicle** .

The Diagnostic System Check - Vehicle will provide the following information:

- The identification of the control modules which command the system
- The ability of the control modules to communicate through the serial data circuit
- The identification of any stored DTCs and their status

The use of the Diagnostic System Check - Vehicle will identify the correct procedure for diagnosing the system and where the procedure is located.

SCAN TOOL OUTPUT CONTROLS

Instrument Panel Cluster (IPC)

Scan Tool Output Control	Additional Menu Selections	Description
IPC Gauge Sweep Test	Special Functions	The instrument panel cluster (IPC) drives all of the gages at or above maximum for a few seconds when you select ON, then drives all of the gages at or below minimum for a few seconds. The IPC Display Test will end after one cycle of the gage sweep.
Displays Test	Special Functions	The IPC illuminates all of the indicators for 7 seconds when you select ON. The IPC turns off the indicators after the 7 seconds.
Dimming	Special Functions	The DIC and the PRNDL display segments turn ON and OFF when commanded from the scan tool.

Engine Control Module (ECM)/Powertrain Control Module (PCM)

Scan Tool Output Control	Additional Menu Selections	Description
Special Functions	Malfunction Indicator Lamp (MIL)	The engine control module (ECM)/Powertrain Control Module (PCM) commands the MIL indicator ON and OFF.

SCAN TOOL DATA LIST

The scan tool data lists contain all the instrument panel, gages and console related parameters that are available on the scan tool. The parameters in the list are arranged in alphabetical order. The data list column indicates the location of the parameter within the scan tool menu selections.

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Use the scan tool data lists as directed by a diagnostic table or in order to supplement the diagnostic procedures. Begin all of the diagnostic procedures with the **Diagnostic System Check - Vehicle** .

Use the scan tool data lists only after the following is determined:

- There is no published DTC procedure nor published symptom procedure for the customer concern.
- The DTC or symptom procedure indicated by the diagnostic system check does not resolve the customer concern.

The typical data values are obtained from a properly operating vehicle under the conditions specified in the first row of the scan tool data list table. Comparison of the parameter values from the suspect vehicle with the typical data values may reveal the source of the customer concern.

Body Control Module (BCM)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Seat Belt Buckled/High Beams OFF/Park Brake Unapplied			
Cruise Control Switch	Cruise Control Data	Cancel/Off/On/Resume/Set/Error	Off
Driver Door Ajar Switch	Doors Data	Door Closed/Door Ajar	Door Closed
Key In Ignition Cylinder Status	Power Mode Data	Key Out/Key In	Key Out
Park Lamp Switch	Exterior Lighting Data	Active/Inactive	Inactive
Driver Identification	Personalization Data	Driver 1/Driver 2/Driver 3/Driver 4/Unknown	Varies w/driver

Instrument Panel Cluster (IPC)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Ignition ON/Engine OFF/Seat Belt Buckled/High Beams OFF/Park Brake Unapplied			
Battery Voltage	IPC	Volts	Varies
Brake Fluid	IPC	Ok/Low	Ok
Brake Fluid Switch	IPC	Volts	Off
DIC Fuel Info.	IPC	Active/Inactive	Inactive

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DIC Information Switch	IPC	Active/Inactive	Inactive
DIC Personalization	IPC	Active/Inactive	Inactive
Heated Washer Fluid Indicator Signal	IPC	Active/Inactive	Inactive
Ignition 1 Input	IPC	Active/Inactive	Active
Ignition Cycle Counter	IPC	Counts	Varies
LCD Dimming	IPC	Percent (%)	Varies
Passenger Seatbelt Indicator Command	IPC	Off/On	Off
Passenger Seatbelt Indicator Status	IPC	Off/On	Off
Trip Reset Switch	IPC	Active/Inactive	Inactive
Washer Fluid Level	IPC	Ok/Low	Ok

Powertrain Control Module (PCM)/Engine Control Module (ECM)

Scan Tool Parameter	Data List	Units Displayed	Typical Data Value
Operating Conditions: Engine Idling/Normal Operating Temperature			
Cruise Control Active	ECM IPC Data	No/Yes	No
Change Engine Oil Indicator Command	ECM IPC Data	Off/On	Off
ECT Sensor	PCM/ECM IPC Data	Celsius (Fahrenheit)	85-105°C (185-220°F)
Engine Oil Level Switch	ECM IPC Data	Ok/Off	Off
Engine Oil Life Remaining	PCM IPC Data	%	0-100% Varies
Engine Oil Pressure Switch	ECM/PCM IPC Data	Ok/Low	Ok
Engine Oil Temperature Calculated	ECM IPC Data	Celsius (Fahrenheit)	Varies w/oil temperature
Engine Speed	ECM/PCM IPC Data	RPM	+/-100 RPM from Desired Idle Speed
Fuel Level Sensor	ECM/PCM IPC Data	Volts	Varies
Fuel Tank Level Remaining	ECM/PCM IPC Data	%	0-100% Varies
Generator Lamp Command	PCM IPC Data	Off/On	Off
Ignition 1 Signal	ECM/PCM IPC Data	Volts	Varies

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Ignition Accessory Signal	ECM IPC Data	Off/On	Off
Low EOP Indicator Command	ECM IPC Data	Off/On	Off
Low Engine Oil Level Indicator Command	ECM IPC Data	Off/On	Off
MIL Circuit Status	PCM IPC Data	Ok/Open/Short/Invalid State	Ok
MIL Circuit Status	ECM IPC Data	Incomplete/Short GND/Open/Short B+/Ok	Ok
MIL Command	ECM/PCM IPC Data	Off/On	Off
Vehicle Speed Sensor	ECM/PCM IPC Data	kph (mph)	0 kph (0 mph)

SCAN TOOL DATA DEFINITIONS**Battery Voltage**

The scan tool displays the system voltage of the vehicle.

Brake Fluid

The scan tool displays Ok/Low. This is the state of the vehicle brake fluid as monitored by the instrument panel cluster (IPC).

Brake Fluid Switch

The scan tool displays volts. This is the state of the brake fluid switch as monitored by the IPC.

Cruise Control Active

The scan tool displays No/Yes. This is the status of the cruise control monitored by the by the engine control module (ECM)/powertrain control module (PCM).

Change Engine Oil Indicator Command

The scan tool displays Off or On. This is the state of the change engine oil indicator as commanded by the ECM.

DIC Fuel Info

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The scan tool displays Active/Inactive. This is the status of the driver information center (DIC) fuel information switch as monitored by the IPC.

DIC Information Switch

The scan tool displays Active/Inactive. This is the status of the DIC information switch as monitored by the IPC.

DIC Personalization

The scan tool displays Active/Inactive. This is the status of the DIC personalization functions as monitored by the IPC.

Driver Door Ajar Switch

The scan tool displays Door Closed or Door Ajar. This is the status of the drivers door switch as commanded by the body control module (BCM).

ECT Sensor

The scan tool displays -40 to +151°C (-40 to +304°F). The ECM/PCM monitors the voltage at the signal circuit of the engine coolant temperature sensor. The voltage is inversely proportional to the engine coolant temperature.

Engine Oil Level Switch

The scan tool displays Ok or Low. This is the status of the engine oil level switch as monitored by the ECM.

Engine Oil Life Remaining

The scan tool displays 0-100%. The PCM calculates the amount of engine oil life remaining.

Engine Oil Pressure Switch

The scan tool displays Ok/Low. This is the state of the engine oil pressure (EOP) switch as monitored by the ECM/PCM

Engine Oil Temperature Calculated

The scan tool displays Celsius/Fahrenheit. This is the temperature of the engine oil as calculated by the ECM.

Engine Speed

The scan tool displays 0-9999 RPM. Engine speed is computed by the ECM/PCM. It should remain close to desired idle under various engine loads with the engine idling.

Fuel Level Sensor

The scan tool displays 0-5 volts. The ECM/PCM monitors the signal circuit of the fuel level sensor and the scan tool displays the fuel level sensor voltage.

Fuel Tank Level Remaining

The scan tool displays 0-100%. The ECM/PCM calculates the amount of fuel remaining based on the signal circuit voltage of the fuel level sensor.

Generator Lamp Command

The scan tool displays Off/On. This is the state of the generator lamp as commanded by the PCM.

Heated Washer Fluid Indicator Signal

The scan tool displays Active/Inactive. This is the status of the heated washer fluid indicator signal as monitored by the IPC.

Ignition 1 Input

The scan tool displays Active/Inactive. This is the state of the ignition 1 input to the IPC.

Ignition 1 Signal

The scan tool displays the system voltage of the vehicle.

Ignition Accessory Signal

The scan tool displays On or Off. The scan tool displays On when there is voltage present at the ignition accessory signal circuit.

Key In Ignition Cylinder Status

The scan tool displays Yes or No. This is the status of the key in ignition switch as monitored by the BCM.

Low EOP Indicator Command

The scan tool displays On or Off. This is the state of the low engine oil pressure (EOP) indicator as monitored by the ECM.

LCD Dimming

The scan tool displays percent (%). This is the percentage of the liquid crystal display (LCD) dimming as monitored by the IPC.

Low Engine Oil Level Indicator Command

The scan tool displays On or Off. This is the state of the low engine oil level indicator as monitored by the ECM.

MIL Circuit Status

The scan tool displays Incomplete/Short to GND/Open/Short to B+/Ok. This is the status of the malfunction indicator lamp (MIL) circuit as monitored by the ECM.

MIL Circuit History

The scan tool displays Ok/Open/Short/Invalid State. This is the status of the MIL circuit as monitored by the PCM.

MIL Command

The scan tool displays On or Off. This is the status of the MIL indicator as commanded by the ECM.

Odometer

The scan tool displays k/mh or MPH. This is the accumulated vehicle odometer as calculated by the ECM.

Passenger Seatbelt Indicator Command

The scan tool displays On or Off. This is the state of the seatbelt indicator command as monitored by the IPC.

Passenger Seatbelt Indicator Status

The scan tool displays On or Off. This is the status of the seatbelt indicator status as monitored by the IPC.

Park Lamp Switch

The scan tool displays On or Off. This is the status of the park lamp switch as commanded by the BCM.

Key In Ignition Cylinder Switch

The scan tool displays Active/Inactive. The IPC monitors the signal circuit of the trip reset switch and the switch state is displayed by the scan tool.

Vehicle Speed Sensor

The scan tool displays 0-255 km/h (0-155 mph). The ECM monitors the signal circuit of the vehicle speed sensor and the vehicle speed is displayed by the scan tool.

Washer Fluid Level

The scan tool displays Ok or Low. This is the status of the washer fluid level as monitored by the IPC.

DTC B0158

DTC Descriptors

DTC B0158 04

Outside Air Temperature (OAT) Sensor Open

DTC B0158 05

Outside Air Temperature (OAT) Sensor Short to Battery or Open

DTC B0158 06

Outside Air Temperature (OAT) Sensor Short to Ground or Open

Diagnostic Fault Information

Perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

DTC B0158

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Outside Air Temperature (OAT) Signal Circuit	B0158 1	B0158 1	B0158 1
Outside Air Temperature (OAT) Ground Reference Circuit	1	B0158 1	1
1. Outside Air Temperature (OAT) Display Inaccurate or Inoperative			

The HVAC module monitors the signal circuit of the outside air temperature sensor. The outside air temperature (OAT) sensor is a thermistor which varies in resistance as the temperature changes. When the resistance of OAT sensor increases, the outside air temperature is cold. When the resistance of the OAT sensor decreases, the outside air temperature is high. The HVAC module interfaces with the ambient air temperature via two discreet circuits. The HVAC module applies 5 volts to an internal input resistor that is connected to the signal circuit of the outside air temperature sensor. The HVAC module provides ground through the low reference circuit. The HVAC module uses the outside air temperature resistance and voltage for automatic control calculations and conversion to temperature values. The HVAC module sends the temperature value to the instrument panel cluster (IPC) via GMLAN serial data circuits for display in the driver information center (DIC). If the OAT sensor is opened or shorted, the temperature display is either a cold or hot extreme. An open OAT sensor will display -40°F (-40°C) in the DIC and an OAT sensor shorted to battery displays +189.5°F (+87.5°C).

Conditions for Running the DTC

- The ignition is in ACCESSORY or RUN.
- The ignition is ON.
- The system voltage is between 9-16 volts.

Conditions for Setting the DTC

- The HVAC module detects that the outside air temperature is -40°F (-40°C).
- The HVAC module detects that the outside air temperature is 189.5°F (87.5°C).

Action Taken When the DTC Sets

- 189.5°F (87.5°C) is displayed in the DIC when the OAT sensor resistance value is less than the lowest OAT sensor resistance threshold.
- -40°F (-40°C) is displayed in the DIC when the OAT sensor resistance value is greater than the highest OAT sensor resistance threshold.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction-free warm-up cycles.
- The HVAC module receives a clear code command from the scan tool.

Reference Information**Schematic Reference**

- **HVAC Schematics**

- **Instrument Cluster Schematics**

Connector End View Reference

- **HVAC Connector End Views**
- **Instrument Panel, Gages and Console Connector End Views**
- **Inline Harness Connector End Views**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

- **Scan Tool Data List**
- **Scan Tool Data List**

Circuit/System Verification

The DIC should display 189.5°F (87.5°C) or -40°F (-40°C).

Circuit/System Testing

1. Ignition OFF disconnect the OAT sensor connector.
2. Ignition OFF, test for less than 1 ohm of resistance between the ground circuit terminal and ground.
 - If greater than 1 ohm, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the driver information center (DIC) displays -40°F (-40°C).
 - If the DIC does not display -40°F (-40°C), test the OAT sensor signal circuit for a short to ground. If the circuit tests normal, replace the HVAC module.
4. Ignition ON, install a 3-amp fused jumper wire between the signal circuit and the ground circuit of the OAT sensor. Verify the DIC displays 189.5°F (87.5°C).
 - If the DIC does not displays 189.5°F (87.5°C), test the signal circuit of the OAT sensor for a short to voltage or an open/high resistance. If the circuit tests normal, replace the HVAC module.
5. If all circuits test normal, test or replace the OAT sensor.

Repair Procedures

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Perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Ambient Air Temperature Sensor Replacement**
- **Control Module References** for the HVAC module replacement, setup and programming

DTC B3567

DTC Descriptors

DTC B3567 01

Driver Information Center Select Switch Circuit Short to Battery

DTC B3567 59

Driver Information Center Select Switch Circuit/Component Protection Time-Out

Diagnostic Fault Information

IMPORTANT: Always perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

DTC B3567

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
DIC Switch Signal Circuit	1	1	B3567	B3567
DIC Switch Ground Reference Circuit	-	1	-	-
1. Driver Information Center (DIC) Switch(es) Inoperative				

Circuit/System Description

The driver information center (DIC) switch is a multiplexed switch. Battery power is provided to the DIC switch via the instrument panel cluster (IPC) with the DIC switch signal circuit pulled up to battery voltage in the IPC. The IPC also provides the DIC switch with a ground reference. The switch input to the IPC is pulled low or grounded when a switch is activated. The DIC switch is a momentary contact switch that connects a series of resistors in a resistor ladder format. The IPC monitors the DIC switch signal circuit to determine the DIC switch inputs. Each switch state - SET/RESET, VEHICLE INFORMATION, PERSONALIZATION - corresponds to a certain resistance value. The IPC determines the switch state by the voltage drop across the resistors. A stuck switch or a short to battery for the sets a DTC.

The TRIP/FUEL DIC switch is monitored on a separate circuit provided by the IPC. The

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TRIP/FUEL switch signal circuit is monitored for a stuck switch but not a short to battery.

Conditions for Running the DTC

The ignition is in ACCESSORY or RUN.

Conditions for Setting the DTC

- The IPC detects that the DIC switch is stuck.
- The IPC detects that the DIC switch return circuit is shorted to battery.

Action Taken When the DTC Sets

The IPC ignores the DIC switch inputs.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 50 malfunction-free warm-up cycles.
- The IPC receives a clear code command from the scan tool.

Diagnostic Aids

- When the Trip/Fuel switch is stuck, all other DIC switches will function correctly. When any of the 3 switches are stuck, only the Trip/Fuel switch will function correctly.
- Only the DIC signal circuit can be diagnosed as shorted to battery.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

- **Instrument Panel, Gages and Console Connector End Views**
- **Inline Harness Connector End Views**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

1. Ignition OFF, disconnect the driver information center (DIC) switch connector.
2. Verify a test lamp does not illuminate when connected between the DIC switch return circuit and ground.
 - o If the test lamp illuminates, check the DIC switch signal circuits for a short to voltage. If all circuits test normal, replace the IPC.
3. If all circuits tests normal, test or replace the DIC switch.

Repair Procedures

IMPORTANT: Always perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Control Module References for the IPC replacement, setup and programming
- Driver Information Display Switch Replacement

DTC P0461

DTC Descriptor

DTC P0461

Fuel Level Sensor Circuit Performance

Diagnostic Fault Information

IMPORTANT: Always perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.

DTC P0461

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Fuel Level Sensor Reference Voltage Circuit	P0462	-	-	P0461
Fuel Level Sensor Signal Circuit	P0462	P0463 1	P0463	P0461
Fuel Level Sensor Low Reference Circuit	-	P0463 1	P0463	P0461
1. Fuel Gage Inaccurate or Inoperative				

Circuit/System Description

The fuel level sensor changes resistance in response to the fuel level. The engine control module (ECM)/powertrain control module (PCM) monitors the signal circuit of the fuel level sensor in order to determine the fuel level. When the fuel tank is full, the sensor resistance is low and the ECM/PCM senses a low signal voltage. When the fuel tank is empty, the sensor resistance is high and the ECM/PCM senses a high signal voltage. The ECM/PCM uses the signal circuit of the fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The ECM/PCM sends the fuel level percentage via GMLAN serial data circuit to the body control module (BCM). The BCM sends the GMLAN message to the instrument panel cluster (IPC) in order to control the fuel gage. The fuel information is also used for misfire and evaporative emission (EVAP) diagnostics.

Conditions for Running the DTC

The engine is running.

Conditions for Setting the DTC

The ECM/PCM does not detect a change in fuel level of at least 1.6 percent over a distance of 193 km (120 miles).

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The ECM/PCM records the operating conditions at the time that the diagnostic test fails. The ECM/PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction-free warm-up cycles.
- The ECM/PCM receives a clear code command from the scan tool.

Reference Information**Fuel Level Specifications****Fuel Level Specifications****Schematic Reference**

- **Instrument Cluster Schematics**
- **Engine Controls Schematics** for the 3.8L engine

- **Engine Controls Schematics** for the 4.6L engine

Connector End View Reference

- **Instrument Panel, Gages and Console Connector End Views**
- **Powertrain Control Module Connector End Views** for the 3.8L engine
- **Engine Controls Connector End Views** for the 4.6L engine

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

1. Ignition OFF, remove the fuel level sender and verify there are no objects interfering with the fuel level sender.
 - o Repair any fuel level sender interference.
2. Replace the fuel level sender.

Repair Procedures

IMPORTANT: Always perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- **Fuel Level Sensor Replacement** for the 4.6L engine
- **Fuel Level Sensor Replacement** for the 3.8L engine
- **Control Module References** for the ECM replacement, setup and programming

DTC P0462

DTC Descriptor

DTC P0462

Fuel Level Sensor Circuit Low Voltage

Diagnostic Fault Information

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IMPORTANT: Always perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.

DTC P0462

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Fuel Level Sensor Reference Voltage Circuit	P0462	-	-	P0461
Fuel Level Sensor Signal Circuit	P0462	P0463 1	P0463	P0461
Fuel Level Sensor Low Reference Circuit	-	P0463 1	P0463	P0461
1. Fuel Gage Inaccurate or Inoperative				

Circuit/System Description

The fuel level sensor changes resistance in response to the fuel level. The engine control module (ECM)/powertrain control module (PCM) monitors the signal circuit of the fuel level sensor in order to determine the fuel level. When the fuel tank is full, the sensor resistance is low and the ECM/PCM senses a low signal voltage. When the fuel tank is empty, the sensor resistance is high and the ECM/PCM senses a high signal voltage. The ECM/PCM uses the signal circuit of the fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The ECM/PCM sends the fuel level percentage via GMLAN serial data circuit to the body control module (BCM). The BCM sends the fuel level information via a GMLAN serial data message to the instrument panel cluster (IPC) in order to control the fuel gage. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

Conditions for Running the DTC

- The ignition is ON, with the engine running.
- The system voltage is between 9-16 volts.

Conditions for Setting the DTC

- The sender output is less than 0.39 volt.
- The above condition is present for greater than 30 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The ECM/PCM records the operating conditions at the time that the diagnostic test fails.

The ECM/PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction-free warm-up cycles.
- The ECM/PCM receives a clear code command from the scan tool.

Reference Information**Fuel Level Specifications****Fuel Level Specifications****Schematic Reference**

- **Instrument Cluster Schematics**
- **Engine Controls Schematics** for the 3.8L engine
- **Engine Controls Schematics** for the 4.6L engine

Connector End View Reference

- **Instrument Panel, Gages and Console Connector End Views**
- **Powertrain Control Module Connector End Views** for the 3.8L engine
- **Engine Controls Connector End Views** for the 4.6L engine

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference**Scan Tool Data List****Circuit/System Verification**

With the scan tool installed and the ignition ON, the Fuel Tank Level Remaining parameter in the ECM/PCM EVAP Data List should indicate a value at or greater than 98 percent.

Circuit/System Testing

1. Ignition OFF, disconnect the fuel level sensor connector.

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2. Ignition ON, with the scan tool observe the Fuel Tank Level Remaining parameter. Verify the Fuel Tank Level remaining parameter is 4 percent or less.
 - If the Fuel Tank Level Remaining parameter indicates a value greater than 4 percent, test the fuel level sensor signal circuit for a short to ground. If the fuel level sensor circuit tests normal, replace the ECM.
3. If all circuits tests normal, test or replace the fuel level sensor.

Repair Procedures

IMPORTANT: Always perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- Fuel Level Sensor Replacement for the 4.6L engine
- Fuel Level Sensor Replacement for the 3.8L engine
- Control Module References for the ECM/PCM replacement, setup and programming

DTC P0463

DTC Descriptor

DTC P0463

Fuel Level Sensor Circuit High Voltage

Diagnostic Fault Information

IMPORTANT: Always perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.

DTC P0463

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Fuel Level Sensor Reference Voltage Circuit	P0462	-	-	P0461
Fuel Level Sensor Signal Circuit	P0462	P0463 1	P0463	P0461
Fuel Level Sensor Low Reference Circuit	-	P0463 1	P0463	P0461
1. Fuel Gage Inaccurate or Inoperative				

Circuit/System Description

The fuel level sensor changes resistance in response to the fuel level. The engine control module (ECM)/powertrain control module (PCM) monitors the signal circuit of the fuel level sensor in order to determine the fuel level. When the fuel tank is full, the sensor resistance is low and the ECM/PCM senses a low signal voltage. When the fuel tank is empty, the sensor resistance is high and the ECM/PCM senses a high signal voltage. The ECM/PCM uses the signal circuit of the fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The ECM/PCM sends the fuel level percentage via GMLAN serial data circuit to the body control module (BCM). The BCM sends the fuel level information via a GMLAN serial data message to the instrument panel cluster (IPC) in order to control the fuel gage. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

Conditions for Running the DTC

- The ignition is ON, with the engine running.
- The system voltage is between 9-16 volts.

Conditions for Setting the DTC

- The sensor output is greater than 2.9 volts.
- The above condition is present for greater than 30 seconds.

Action Taken When the DTC Sets

- The fuel gage defaults to empty.
- The low fuel indicator illuminates.
- The ECM/PCM records the operating conditions at the time that the diagnostic test fails. The ECM/PCM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction-free warm-up cycles.
- The ECM/PCM receives a clear code command from the scan tool.

Reference Information**Fuel Level Specifications****Fuel Level Specifications****Schematic Reference**

- **Instrument Cluster Schematics**
- **Engine Controls Schematics** for the 3.8L engine

- **Engine Controls Schematics** for the 4.6L engine

Connector End View Reference

- **Instrument Panel, Gages and Console Connector End Views**
- **Powertrain Control Module Connector End Views** for the 3.8L engine
- **Engine Controls Connector End Views** for the 4.6L engine

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference**Scan Tool Data List****Circuit/System Verification**

With the scan tool installed and the ignition ON, the Fuel Tank Level Remaining parameter in the ECM/PCM EVAP Data List indicates a value at or greater than 4 percent.

Circuit/System Testing

1. Ignition OFF, disconnect the fuel level sensor connector.
2. Install a 3-Amp fused jumper wire between the signal circuit and the low reference circuit of the fuel level sensor. Observe the Fuel Tank Level Remaining parameter and verify the Fuel Tank Level Remaining parameter is greater than 98 percent.
 - If less than 98 percent, test the fuel level sensor signal and low reference circuits for a short to voltage or an open/high resistance. If the circuits test normal, replace the ECM.
3. If all circuits tests normal, test or replace the fuel level sensor.

Repair Procedures

IMPORTANT: Always perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Fuel Level Sensor Replacement** for the 4.6L engine
- **Fuel Level Sensor Replacement** for the 3.8L engine
- **Control Module References** for the ECM/PCM replacement, setup and programming

DTC P0464**Circuit Description**

The fuel level sensor changes resistance based on the fuel level. The engine control module (ECM) monitors the signal circuit of the fuel level sensor in order to determine fuel level. When the fuel tank is full, the sensor resistance is low and the ECM senses a low signal voltage. When the fuel tank is empty, the sensor resistance is high and the ECM senses a high signal voltage. The ECM uses the signal circuit of the fuel level sensor in order to calculate the total remaining fuel percent in the tank. The ECM sends the fuel level message via the class 2 serial data circuit to the instrument panel cluster (IPC) for the fuel gage display. The fuel level information is also used for misfire and evaporative emission (EVAP) diagnostics.

This diagnostic tests for an intermittent fuel level sensor signal. If a change in fuel level is detected, the engine-off natural vacuum small leak test DTC P0442 is aborted due to a refueling event. Before aborting DTC P0442 a refueling event test is executed to confirm that a refueling event has occurred. If refueling is confirmed, the test is considered a pass. Otherwise, the DTC P0464 sets indicating an intermittent signal problem.

DTC Descriptor

This diagnostic procedure supports the following DTC:

DTC P0464 Fuel Level Sensor Circuit Intermittent

Conditions for Running the DTC

- The ignition is OFF.
- DTC P0442 is running.

Conditions for Setting the DTC

- The fuel level change is greater than 10 percent during engine off test.
- The above condition is present for greater than 30 seconds.

Action Taken When the DTC Sets

- DTC P0442 is aborted.
- The ECM records the operating conditions at the time the diagnostic fails. The ECM displays the failure information in the Failure Records on the scan tool.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction-free warm-up cycles.

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- The ECM receives the clear code command from the scan tool.

Diagnostic Aids

- Use the Freeze Frame and/or Failure Records data in order to locate an intermittent condition. If you cannot duplicate the DTC, the information included in the Freeze Frame and/or Failure Records data may aid in determining the number of miles since the DTC set. The Fail Counter and Pass Counter can also aid in determining the number of ignition cycles that the diagnostic reported a pass and/or fail. Operate the vehicle within the same freeze frame conditions, i.e. RPM, engine load, vehicle speed, temperature, etc. This will isolate when the DTC failed.

Refer to **Testing for Intermittent Conditions and Poor Connections** .

- If the DTC sets without a refueling event, refer to **Fuel Gage Inaccurate or Inoperative**.

DTC P0520

DTC Descriptor

DTC P0520

Engine Oil Pressure (EOP) Sensor Circuit

Diagnostic Fault Information

IMPORTANT: Always perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

DTC P0520

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Engine Oil Pressure Sensor Signal Circuit	1	P0520	P0520	-
Engine Oil Pressure Sensor Ground Circuit	-	P0520	-	-
1. Engine Oil Pressure Indicator Always On				

Circuit/System Description

The engine oil pressure (EOP) switch is a normally closed switch that opens with the proper oil pressure. With the ignition switch turned ON and the engine not running, the engine control module (ECM)/powertrain control module (PCM) should detect a low signal voltage input.

With the engine running, the oil pressure switch opens and the ECM/PCM detects a high signal voltage input. The ECM/PCM tests the state of the EOP signal circuit with the ignition switch turned ON and the engine turned OFF. When the oil pressure is low, the ECM/PCM sends a GMLAN serial data message to the body control module (BCM) requesting the EOP indicator turned ON. The instrument panel cluster (IPC) illuminates the EOP indicator when the IPC receives a serial data message from the BCM requesting the EOP indicator turned ON.

Conditions for Running the DTC

The ignition is ON, with the engine ON.

Conditions for Setting the DTC

- The ECM/PCM detects that the EOP sensor signal circuit is pulled high.
- The above condition is present for greater than 10 seconds.

Action Taken When the DTC Sets

- The ECM/PCM records the operating conditions at the time the diagnostic test fails. The ECM/PCM displays this information in the Failure Records on the scan tool.
- The instrument panel cluster (IPC) illuminates the engine oil pressure indicator.

Conditions for Clearing the DTC

- The DTC becomes history when the conditions for setting the DTC are no longer present.
- The history DTC clears after 40 malfunction-free warm-up cycles.
- The ECM/PCM receives a clear code command from the scan tool.

Reference Information**Schematic Reference**

- **Instrument Cluster Schematics**
- **Engine Controls Schematics** for the 4.6L engine
- **Engine Controls Schematics** for the 3.8L engine

Connector End View Reference

- **Instrument Panel, Gages and Console Connector End Views**
- **Engine Controls Connector End Views** for the 4.6L engine
- **Powertrain Control Module Connector End Views** for the 3.8L engine

Electrical Information Reference

- **Circuit Testing**

- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference**Scan Tool Data List****Circuit/System Testing**

IMPORTANT: Do not turn the key to the crank position or engage the starter at any time during diagnosis.

1. Ignition OFF, disconnect the engine oil pressure (EOP) switch connector.
2. Ignition OFF, test for less than 1 ohm of resistance between the ground circuit and ground.
 - If greater than 1 ohm, test the ground circuit for an open/high resistance.
3. Ignition ON, install a 3-Amp fused jumper wire between the signal circuit of the EOP switch and ground. Verify the scan tool Engine Oil Pressure Switch parameter is Low.
 - If not Low, test the signal circuit of the EOP switch for a short to voltage or an open/high resistance. If circuit test normal, replace the ECM.
4. If all circuits test normal, replace the engine oil pressure switch.

Repair Procedures

IMPORTANT: Always perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- **Engine Oil Pressure Sensor and/or Switch Replacement** for the 4.6L engine
- **Engine Oil Pressure Sensor and/or Switch Replacement** for the 3.8L engine
- **Control Module References** for the ECM replacement, setup and programming

SYMPTOMS - INSTRUMENT PANEL, GAGES AND CONSOLE

IMPORTANT: The following steps must be completed before using the symptom diagnostic tables.

1. Before using the symptom diagnostic tables, perform the **Diagnostic System Check - Vehicle** in order to determine that there are no DTCs set and that the control modules can communicate via the serial data link.
2. Review the system operation in order to understand the system functions. Refer to the

following description and operations.

- **Instrument Cluster Description and Operation**
- **Indicator/Warning Message Description and Operation**
- **Driver Information Center (DIC) Description and Operation**
- **Audible Warnings Description and Operation**

Visual/Physical Inspection

- Inspect for aftermarket devices which can affect the operation of the instrument panel cluster or the audible warnings system. Refer to **Checking Aftermarket Accessories** .
- Inspect the accessible system components or the visible system components for obvious damage or for obvious conditions which can cause the symptom.
- Inspect for the proper fluid levels.

Intermittent

Faulty electrical connections or wiring may be the cause of intermittent conditions. Refer to **Testing for Intermittent Conditions and Poor Connections** .

Symptom List

Refer to a symptom diagnostic procedure from the following list in order to diagnose the symptom:

Gages and Odometer

- **Instrument Cluster Gages Inoperative**
- **Fuel Gage Inaccurate or Inoperative**

Indicators

- **ABS Indicator Always On**
- **ABS Indicator Inoperative**
- **Air Bag Indicator Circuit Malfunction**
- **Brake Warning Indicator Always On**
- **Brake Warning Indicator Inoperative**
- **Charge Indicator Always On**
- **Charge Indicator Inoperative**
- **Cruise Control Switch Indicator Always On**
- **Door Ajar Indicator Malfunction**
- **Front Fog Lamps Malfunction**

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- **Front Fog Lamps Malfunction**
- **Headlamps Malfunction**
- **Headlamps Malfunction**
- **Engine Oil Pressure Indicator Always On**
- **Information Center Telltale Malfunction**
- **Low Engine Coolant Indicator Always On**
- **Headlamps Malfunction**
- **Headlamps Malfunction**
- **Low Engine Oil Level Indicator Always On**
- **Low Washer Fluid Indicator Malfunction**
- **Malfunction Indicator Lamp (MIL) Diagnosis** for the 3.8L engine
- **Malfunction Indicator Lamp (MIL) Diagnosis** for the 4.6L engine
- **Odometer Trip/Reset Switch Inoperative**
- **Outside Air Temperature Display Inaccurate or Inoperative**
- **Passenger Presence System Indicator Circuit Malfunction**
- **Seat Belt Indicator Circuit Malfunction - Driver**
- **Seat Belt Indicator Circuit Malfunction - Passenger**
- **Security Indicator Inoperative**
- **Traction Off Indicator Always On**
- **Traction Off Indicator Inoperative**
- **Trunk Ajar Indicator Always On**
- **Trunk Ajar Indicator Inoperative**
- **Turn Signal Lamps and/or Indicators Malfunction**
- **Turn Signal Lamps and/or Indicators Malfunction**

Driver Information Center

Driver Information Center (DIC) Switch(es) Inoperative

Audible Warnings

- **Chime Always On**
- **Chime Inoperative**

FUEL GAGE INACCURATE OR INOPERATIVE

Diagnostic Fault Information

IMPORTANT: Always perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.

Circuit/System Description

The fuel level sensor changes resistance in response to the fuel level. The engine control module (ECM)/powertrain control module (PCM) monitors the signal circuit of the fuel level sensor in order to determine the fuel level. When the fuel tank is full, the sensor resistance is low and the ECM/PCM senses a low signal voltage. When the fuel tank is empty, the sensor resistance is high and the ECM/PCM senses a high signal voltage. The ECM/PCM uses the signal circuit of the fuel level sensor in order to calculate the percentage of remaining fuel in the tank. The ECM/PCM sends the fuel level percentage via the GMLAN serial data circuit to the body control module (BCM). The BCM sends the fuel level information to the instrument panel cluster via the GMLAN serial data circuit in order to control the fuel gage and display the fuel level. Then fuel information is also used for misfire and evaporative emission (EVAP) diagnostics.

Reference Information

Schematic Reference

- **Instrument Cluster Schematics**
- **Engine Controls Schematics** for the 4.6L engine
- **Engine Controls Schematics** for the 3.8L engine

Connector End View Reference

- **Instrument Panel, Gages and Console Connector End Views**
- **Engine Controls Connector End Views** for the 4.6L engine
- **Powertrain Control Module Connector End Views** for the 3.8L engine

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

1. Ignition OFF, disconnect the fuel level sensor connector, install a signal generator and instrument panel tester between the signal circuit and the low reference circuit.
2. Ignition ON, vary the resistance on the signal generator from 40 ohms - 250 ohms. With the scan tool verify that the Fuel Tank Level Remaining parameter displays the correct fuel level percent. Refer to **Fuel Level Specifications**.
 - If the fuel level percent is incorrect, test the signal circuit and the low reference circuit for an open/high resistance. If all circuit tests normal, replace the ECM.
3. Ignition ON, vary the resistance on the signal generator from 40 ohms - 250 ohms. Observe the fuel gage and verify that the fuel gage displays the correct fuel level. Refer to **Fuel Level Specifications**.
 - If the fuel gage display is incorrect, test or replace the fuel gage.
4. If all circuits test normal, test or replace the fuel level sensor.

Repair Procedures

IMPORTANT: Always perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Fuel Level Sensor Replacement** for the 4.6L engine
- **Fuel Level Sensor Replacement** for the 3.8L engine
- **Control Module References** for the ECM/PCM and IPC replacement, setup and programming

INSTRUMENT CLUSTER GAGES INOPERATIVE**Diagnostic Fault Information**

IMPORTANT: Always perform the **Diagnostic System Check - Vehicle**

Circuit/System Description

This diagnostic procedure applies to serial data gages located in the instrument panel cluster (IPC) which include the speedometer, tachometer, engine coolant temperature gage and volt gage if equipped.

Reference Information**Schematic Reference****Instrument Cluster Schematics****Connector End View Reference**

- **Instrument Panel, Gages and Console Connector End Views**

- **Inline Harness Connector End Views**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference**Scan Tool Data List****Circuit/System Testing**

IMPORTANT: If the suspect gage is the speedometer, the drive wheels of the vehicle must be raised and the transmission must be placed in drive or first gear.

1. Ignition ON, with the scan tool, perform the IPC Gage Sweep Test in the IPC Output Controls. Verify that all gage dials move from minimum to the maximum value and back to the gage minimum value.
 - o If the gage does not perform the IPC Gage Sweep Test, replace the IPC.
2. Start the engine, with the vehicle drive wheels raised and place the transmission in drive or first gear. Verify that the speedometer value matches the scan tool Vehicle Speed parameter in the ECM Engine Data List.
 - o If the speedometer is incorrect, test or replace the IPC.

Repair Procedures

IMPORTANT: Always perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

Control Module References for the IPC replacement, setup and programming.

ODOMETER TRIP/RESET SWITCH INOPERATIVE**Diagnostic Fault Information**

IMPORTANT: Always perform the **Diagnostic System Check - Vehicle**

Circuit/System Description

The instrument panel cluster (IPC) calculates the mileage based on the vehicle speed signal

circuit from the engine control module (ECM). The ECM/powertrain control module (PCM) sends a serial data message to the IPC indicating the value of the odometer. The odometer will display 'error' if an internal memory failure is detected. The odometer displays either miles or kilometers and the desired units can be accessed by pressing the trip/reset switch.

Reference Information**Schematic Reference****Instrument Cluster Schematics****Connector End View Reference****Instrument Panel, Gages and Console Connector End Views****Electrical Information Reference**

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference**Scan Tool Data List****Circuit/System Testing**

1. Ignition OFF, disconnect the DIC switch connector.
2. Test for less than 1 ohm of resistance between the DIC switch ground circuit and ground.
 - If greater than 1 ohm, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the scan tool Trip Reset Switch parameter is Inactive.
 - If not inactive, test the signal circuit for a short to ground. If the circuit tests normal, replace the IPC.
4. Install a 3-Amp fused jumper wire between the signal circuit and ground. Verify the scan tool Trip Reset Switch parameter is Active.
 - If not active, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the IPC.
5. If all circuits test normal, test or replace the DIC switch.

Repair Procedures

IMPORTANT: Always perform the Diagnostic Repair Verification

Control Module References for the IPC replacement, setup and programming.

ENGINE OIL PRESSURE INDICATOR ALWAYS ON

Diagnostic Fault Information

IMPORTANT: Always perform the **Diagnostic System Check - Vehicle** .

Engine Oil Pressure Indicator Always On

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Engine Oil Pressure Sensor Signal Circuit	1	P0520	P0520	-
Engine Oil Pressure Sensor Ground Circuit	-	P0520	-	-
1. Engine Oil Pressure Indicator Always On				

Circuit/System Description

The engine oil pressure (EOP) switch is a normally closed switch that opens with the proper oil pressure. With the ignition switch turned ON and the engine not running, the engine control module (ECM) should detect a low signal voltage input. With the engine running, the pressure switch opens and the ECM should detect a high signal voltage input. The ECM tests the state of the EOP signal circuit with the ignition switch turned ON and the engine turned OFF. The instrument panel cluster (IPC) illuminates the EOP indicator when the IPC receives a serial data message from the ECM requesting the EOP indicator turned ON.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

- **Instrument Panel, Gages and Console Connector End Views**
- **Engine Controls Connector End Views** for the 4.6L engine
- **Powertrain Control Module Connector End Views** for the 3.8L engine
- **Inline Harness Connector End Views**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**

- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference**Scan Tool Data List****Circuit/System Testing**

IMPORTANT: Do not turn the key to the crank position or engage the starter at any time during diagnosis.

1. Ignition ON, verify the scan tool Engine Oil Pressure (EOP) Switch parameter is Low.
 - If not Low, replace the instrument panel cluster (IPC).
 2. Ignition OFF, disconnect the EOP switch.
 3. Ignition ON, verify the scan tool Engine Oil Pressure Switch parameter is OK.
 - If not OK, test the signal circuit of the EOP switch for a short to ground. If the circuit tests normal, replace the ECM.
- If OK, replace the EOP switch.

Repair Procedures

IMPORTANT: Always perform the Diagnostic Repair Verification .

- **Engine Oil Pressure Sensor and/or Switch Replacement** for the 4.6L engine
- **Engine Oil Pressure Sensor and/or Switch Replacement** for the 3.8L engine
- **Control Module References** for IPC replacement, setup and programming

LOW ENGINE OIL LEVEL INDICATOR ALWAYS ON**Diagnostic Fault Information**

IMPORTANT: Always perform the Diagnostic System Check - Vehicle .

Low Engine Oil Level Indicator Always On

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
Engine Oil Level Sensor/Switch Signal Circuit	-	1	1	-
Engine Oil Level Low	-	1	-	-

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Reference Circuit				
1. Low Engine Oil Level Indicator Always On				

Circuit/System Description

The engine oil level (EOL) sensor/switch is a normally closed switch that opens with a low engine oil level condition. With the ignition switch turned ON and the engine not running, the engine control module (ECM) or the powertrain control module (PCM) detects a low signal voltage at the signal circuit of engine oil level sensor/switch. When the engine is running and the engine oil level is low, the ECM/PCM detects a high signal voltage at the signal circuit of the engine oil level sensor/switch. The ECM/PCM monitors the engine oil level switch signal circuit. When the ECM/PCM detects a high signal voltage on the engine oil level switch signal circuit, the ECM/PCM sends a GMLAN serial data message to the instrument panel cluster (IPC) requesting the low engine oil indicator ON.

Diagnostic Aids

- When the Low Engine Oil Level indicator displays in the driver information center (DIC) due to a low engine oil level condition, make sure that the ignition is turned OFF before adding or changing the oil in the vehicle. Failure to do so may result in the Low Engine Oil Level indicator or message staying on after the engine attains proper oil level.
- When the Low Engine Oil Level indicator displays in the DIC and the ignition is not turned OFF before adding or changing the engine oil, the Low Engine Oil Level indicator may stay ON even after the proper oil level is attained. For the Low Engine Oil Level indicator to turn OFF, the engine has to undergo a thermocycle process, refer to **Indicator/Warning Message Description and Operation**
- Before replacing the IPC because of the Low Engine Oil Level indicator staying ON after an oil change or engine oil addition, it is necessary for the engine to undergo a thermocycle process. The IPC may not be malfunctioning but only needs the Low Engine Oil Level indicator to turn OFF after an engine thermocycle process. Refer to **Indicator/Warning Message Description and Operation**

Reference Information

Schematic Reference

- **Instrument Cluster Schematics**
- **Engine Controls Schematics** for the 4.6L engine
- **Engine Controls Schematics** for the 3.8L engine

Connector End View Reference

- **Instrument Panel, Gages and Console Connector End Views**
- **Engine Controls Connector End Views** for the 4.6L engine

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- **Powertrain Control Module Connector End Views** for the 3.8L engine

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector of the engine oil level switch.
2. Ignition OFF, test for less than 1.0 ohm of resistance between the ground circuit and ground.
 - If greater than 1.0 ohm, test the ground circuit for an open/high resistance.
3. Install a 3-amp fused jumper wire between the signal circuit and ground. Verify the scan tool Engine Oil Level Switch parameter is OK.
 - If not OK, test the signal circuit for an open/high resistance. If the circuit tests normal, replace the ECM.
4. If all circuits test normal, test or replace the engine oil level switch.

Repair Procedures

IMPORTANT: Always perform the Diagnostic Repair Verification .

- **Engine Oil Level Sensor and/or Switch Replacement** for the 4.6L engine
- **Engine Oil Level Sensor and/or Switch Replacement** for the 3.8L engine

DRIVER INFORMATION CENTER (DIC) SWITCH(ES) INOPERATIVE

Diagnostic Fault Information

IMPORTANT: Always perform the Diagnostic System Check - Vehicle .

Driver Information Center (DIC) Switch(es) Inoperative

Circuit	Short to Ground	Open/High Resistance	Short to Voltage	Signal Performance
DIC Switch Signal	1	1	P3567	P3567

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Circuit				
DIC Switch Ground Reference Circuit	-	1	-	-
1. Driver Information Center (DIC) Switch(es) Inoperative				

Circuit/System Description

The driver information center (DIC) switch is a multiplexed switch. Battery power is provided to the DIC switch via the instrument panel cluster (IPC) with the DIC switch signal circuit pulled up to battery voltage in the IPC. The IPC also provides the DIC switch with a ground reference. The switch input to the IPC is pulled low or grounded when a switch is activated. The DIC switch is a momentary contact switch that connects a series of resistors in a resistor ladder format. The IPC monitors the DIC switch signal circuit to determine the DIC switch inputs. Each switch state - SET/RESET, VEHICLE INFORMATION, PERSONALIZATION - corresponds to a certain resistance value. The IPC determines the switch state by the voltage drop across the resistors. A stuck switch or a short to battery for the sets a DTC.

The TRIP/FUEL DIC switch is monitored on a separate circuit provided by the IPC. The TRIP/FUEL switch signal circuit is monitored for a stuck switch but not a short to battery.

Reference Information

Schematic Reference

Instrument Cluster Schematics

Connector End View Reference

- Instrument Panel, Gages and Console Connector End Views
- Inline Harness Connector End Views

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

1. Ignition OFF, disconnect the harness connector at the driver information center (DIC)

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switch assembly.

2. Ignition OFF, test for less than 1 ohm of resistance between the ground reference circuit and ground.
 - If greater than 1 ohm, test the ground reference circuit for an open/high resistance.
3. Ignition ON, verify that all scan tool DIC Switch parameters are Inactive.
 - If all DIC switch parameters are not Inactive, test the signal circuit for a short to ground. If the circuit tests normal, replace the instrument panel cluster (IPC).
4. Ignition ON, install a 3-Amp fused jumper wire between the signal circuit and the ground reference circuit. Verify that all scan tool DIC switch parameters are Active.
 - If not Active, test the signal circuit for a short to voltage or an open/high resistance. If the circuit tests normal, replace the IPC.
5. If all circuits test normal, test or replace the DIC switch.

Repair Procedures

IMPORTANT: Always perform the Diagnostic Repair Verification after completing the diagnostic procedure.

Driver Information Display Switch Replacement.

OUTSIDE AIR TEMPERATURE DISPLAY INACCURATE OR INOPERATIVE

Diagnostic Fault Information

IMPORTANT: Always perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.

Outside Air Temperature Display Inaccurate or Inoperative

Circuit	Short to Ground	Open/High Resistance	Short to Voltage
Outside Air Temperature (OAT) Signal Circuit	B0158 1	B0158 1	B0158 1
Outside Air Temperature (OAT) Ground Reference Circuit	-	B0158 1	1
1. Outside Air Temperature (OAT) Display Inaccurate or Inoperative			

Circuit/System Description

The HVAC module monitors the signal circuit of the outside air temperature sensor. The outside air temperature (OAT) sensor is a thermistor which varies in resistance as the temperature changes. When the resistance of OAT sensor increases, the outside air temperature is cold. When the resistance of the OAT sensor decreases, the outside air temperature is high.

The HVAC module interfaces with the ambient air temperature via two discreet circuits. The HVAC module applies 5 volts to an internal input resistor that is connected to the signal circuit of the outside air temperature sensor. The HVAC module provides ground through the low reference circuit. The HVAC module uses the outside air temperature resistance and voltage for automatic control calculations and conversion to temperature values. The HVAC module sends the temperature value to the instrument panel cluster (IPC) via GMLAN serial data circuits for display in the driver information center (DIC). If the OAT sensor is opened or shorted, the temperature display is either a cold or hot extreme. An open OAT sensor will display -40°F (-40°C) in the DIC and an OAT sensor shorted to battery displays +189.5°F (+87.5°C).

Diagnostic Aids

- The following variable represents the latest temperature value to be displayed by the DIC. This variable can be Degrees Fahrenheit or Celsius.

Range: -40°C to +87.5°C (-40°F to +189.5°F). The default readout is 87.5°C (190°F).

- After the ignition has been shutoff and the engine is not running, the OAT sensor must cool down for a period of time before OAT sensor reading is accurate. This is because the engine produces considerable heat after it has been shutdown. Without air movement across the OAT sensor such as when the vehicle is moving, the OAT sensor provides a false outside temperature reading that can be attributed to engine heat. A falling OAT sensor reading is always accepted and filtered into the display.
- Upon initial vehicle startup, the OAT sensor speed counter estimates the amount of time the vehicle will need to be in motion before the OAT sensor will be reading true outside temperature. As soon as the counter reaches this point it is assumed the driver has been driving the given amount of time for the sensor to cool to ambient. At this point the outside air temperature readings are filtered into the display.

Reference Information**Schematic Reference**

- **HVAC Schematics**
- **Instrument Cluster Schematics**

Connector End View Reference

- **HVAC Connector End Views**
- **Instrument Panel, Gages and Console Connector End Views**
- **Inline Harness Connector End Views**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference

- **Scan Tool Data List**
- **Scan Tool Data List**

Circuit/System Verification

The DIC should display -189°F (87°C) or -40°F (-40°C).

Circuit/System Testing

1. Ignition OFF disconnect the OAT sensor connector.
2. Ignition OFF, test for less than 1 ohm of resistance between the ground circuit terminal and ground.
 - If greater than 1 ohm, test the ground circuit for an open/high resistance.
3. Ignition ON, verify the driver information center (DIC) displays -40°F (-40°C).
 - If the DIC does not display -40°F (-40°C), test the OAT sensor signal circuit for a short to ground. If the circuit tests normal, replace the HVAC module.
4. Ignition ON, install a 3-Amp fused jumper wire between the signal circuit and the ground circuit of the OAT sensor. Verify the DIC displays -189°F (87°C).
 - If the DIC does not displays -189°F (87°C), test the signal circuit of the OAT sensor for a short to voltage or an open/high resistance. If the circuit tests normal, replace the HVAC module.
5. If all circuits test normal, test or replace the OAT sensor.

Repair Procedures

IMPORTANT: Always perform the Diagnostic Repair Verification after completing the diagnostic procedure.

- **Ambient Air Temperature Sensor Replacement**
- **Control Module References** for the HVAC module replacement, setup and programming.

CHIME ALWAYS ON**Diagnostic Fault Information**

IMPORTANT: Always perform the Diagnostic System Check - Vehicle prior to using this diagnostic procedure.

Circuit/System Description

The radio generates the audible warning through the left speaker. The radio receives audible warning requests via GMLAN serial data from the instrument panel cluster (IPC) or the body control module (BCM).

Reference Information

Schematic Reference

- Instrument Cluster Schematics
- Audible Warnings Schematics
- Body Control System Schematics

Connector End View Reference

- Instrument Panel, Gages and Console Connector End Views
- Computer/Integrating Systems Connector End Views
- Inline Harness Connector End Views

Electrical Information Reference

- Circuit Testing
- Connector Repairs
- Testing for Intermittent Conditions and Poor Connections
- Wiring Repairs

Scan Tool Reference

Scan Tool Data List

Circuit/System Testing

IMPORTANT: Before performing this diagnostics, make sure no indicator(s) are illuminated after the IPC performs a lamp test. If any indicators are illuminated after the bulb test, perform the indicator diagnostics before this diagnostics.

1. Ignition ON, headlamp switch OFF, verify the scan tool Headlamp Switch parameter is Inactive.
 - If not Inactive, refer to Headlamps Malfunction .

2. Ignition ON, park lamp switch OFF, verify the scan tool Park Lamps Switch parameter is Inactive.
 - If not Inactive refer to **Park, License, and/or Tail Lamps Malfunction** .
3. Ignition ON, doors closed, verify the scan tool All Door Lock Command is On.
 - If not On, refer to **Courtesy Lamps Malfunction** .
4. Ignition OFF, key out of the ignition, verify the scan tool Key In Ignition Status parameter is Inactive.
 - If not Inactive, test the key in ignition switch signal circuit for a short to ground. If the circuits tests normal, replace the ignition switch.

Repair Procedures

IMPORTANT: Always perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Ignition and Start Switch Replacement**
- **Control Module References** for the BCM replacement, setup and programming

CHIME INOPERATIVE**Diagnostic Fault Information**

IMPORTANT: Always perform the **Diagnostic System Check - Vehicle** prior to using this diagnostic procedure.

Circuit/System Description

The radio generates the audible warning through the left speaker. The radio receives audible warning requests via GMLAN serial data from the instrument panel cluster (IPC) or the body control module (BCM).

Reference Information**Schematic Reference**

- **Instrument Cluster Schematics**
- **Audible Warnings Schematics**
- **Body Control System Schematics**

Connector End View Reference

- **Instrument Panel, Gages and Console Connector End Views**
- **Computer/Integrating Systems Connector End Views**

- **Inline Harness Connector End Views**

Electrical Information Reference

- **Circuit Testing**
- **Connector Repairs**
- **Testing for Intermittent Conditions and Poor Connections**
- **Wiring Repairs**

Scan Tool Reference**Scan Tool Data List****Circuit/System Testing**

IMPORTANT: Before performing this diagnostics, make sure no indicator(s) are illuminated after the IPC performs a lamp test. If any indicators are illuminated after the bulb test, perform the indicator diagnostics before this diagnostics.

1. Ignition ON, radio ON, adjust the radio balance and fade to the left front speaker.
 - If the speaker does not operate properly, refer to **Speakers Inoperative - One or More** .
2. Ignition ON, verify that the scan tool Key In Ignition Status parameter is Key In.
 - If not Key In, test the signal circuit and ground for a short to voltage or an open/high resistance. If all circuits test normal, replace the ignition switch.

Repair Procedures

IMPORTANT: Always perform the **Diagnostic Repair Verification** after completing the diagnostic procedure.

- **Ignition and Start Switch Replacement**
- **Control Module References** for the radio replacement, setup and programming

REPAIR INSTRUCTIONS**ELECTRONIC COMPASS CALIBRATION****Compass Calibration**

The compass direction will show CAL if it needs to be calibrated. Before calibrating the compass, drive the vehicle to an area that is magnetically clean (free of large metallic objects).

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1. Turn ON the ignition.
2. Before calibrating the compass, make sure the compass is set to the variance zone in which the vehicle is travelling. See Compass Magnetic Variation Adjustment below.
3. Press the vehicle information button until the PRESS TO CALIBRATE COMPASS screen is displayed.
4. Press the set/reset button to start the compass calibration.
5. The DIC will display CALIBRATING: DRIVE IN CIRCLES. Drive the vehicle in circles at less than 8 km/h (5 mph) to complete the calibration. The DIC will display CALIBRATION COMPLETE when the calibration is complete.

Compass Magnetic Variation Adjustment

Compass variance is the difference between the earth's magnetic north and true geographic north. If not adjusted to account for compass variance, the compass in the vehicle could give false readings. Under certain circumstances, such as during a long distance cross-country trip, it will be necessary to compensate for compass variance and reset the zone through the DIC.

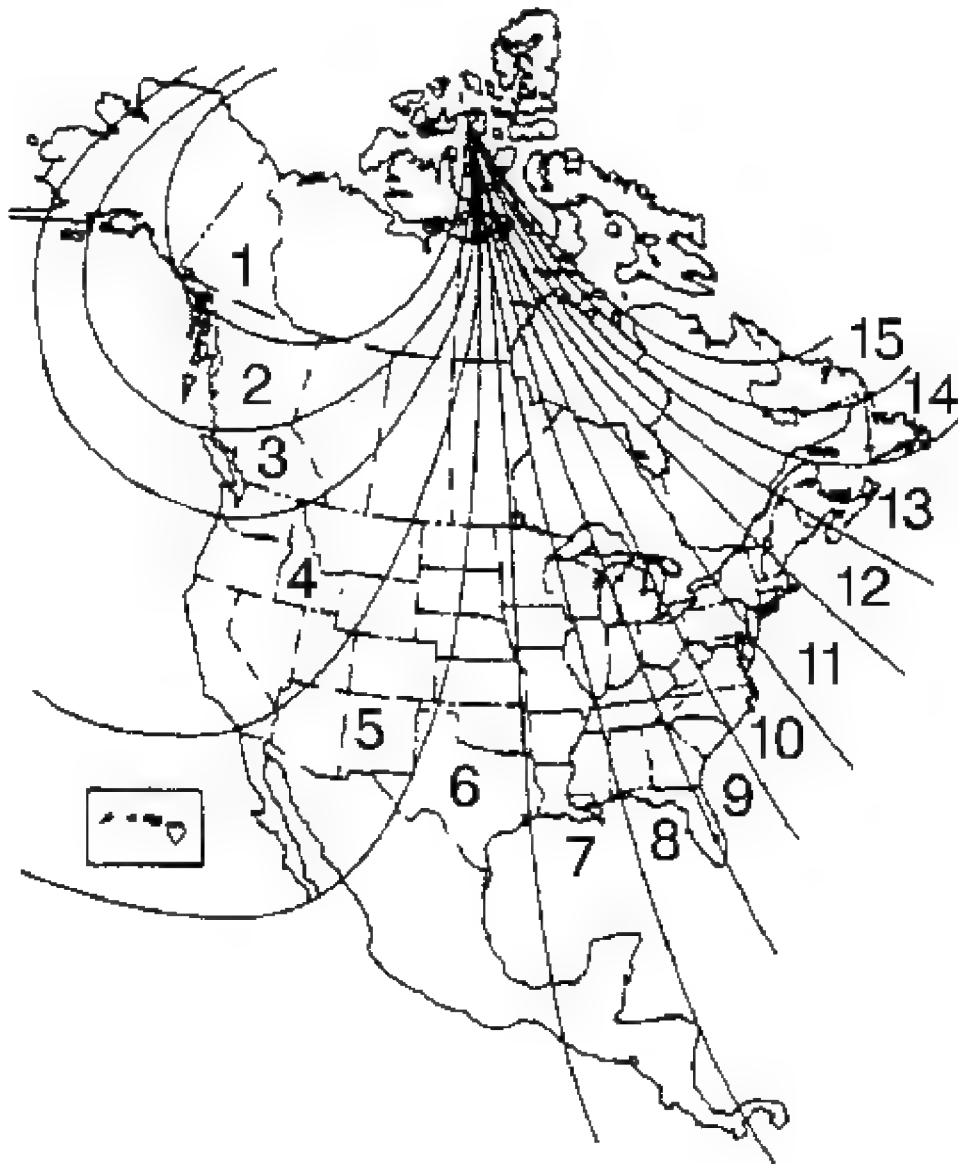


Fig. 16: Illustrating Magnetic Variation Zones
Courtesy of GENERAL MOTORS CORP.

1. Locate your geographic location. See the variation zone map.
2. Turn ON the ignition with the engine OFF.
3. Press the vehicle information button until PRESS TO CHANGE COMPASS ZONE displays on the DIC.
4. Press the set/reset button to scroll through and select the appropriate variance zone.

5. Navigate to one of the trip/fuel menu screens to view the direction the vehicle is moving. This will be shown in the top right corner of the DIC display.

If the compass needs to be calibrated, use the compass calibration procedure above.

INSTRUMENT PANEL INSULATOR PANEL REPLACEMENT - RIGHT SIDE

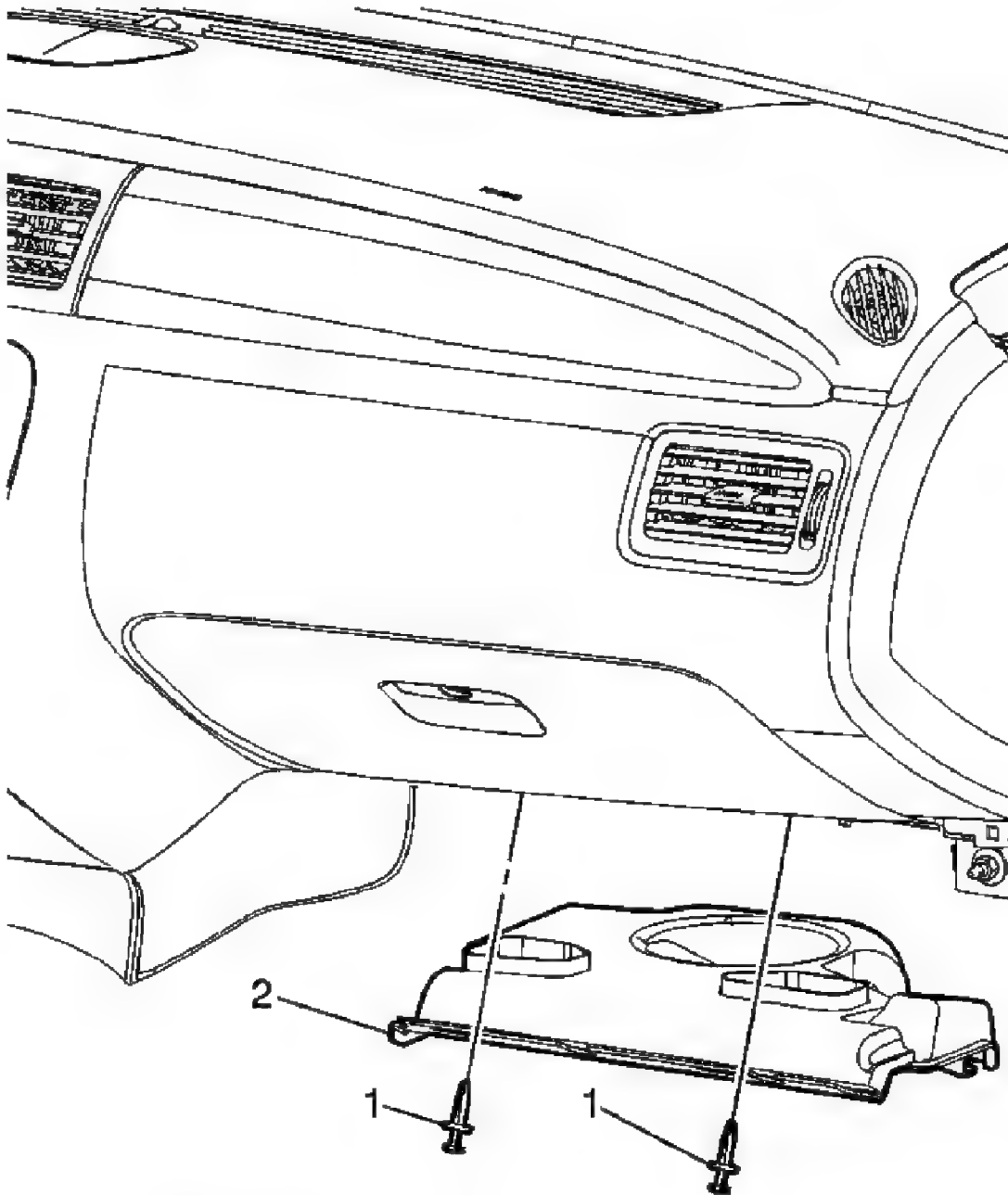


Fig. 17: Locating Right Side Insulator Panel
Courtesy of GENERAL MOTORS CORP.

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Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Push Pin Retainers (Qty: 2)
2	Instrument Panel Insulator Assembly Tip: Remove the courtesy lamp from the insulator panel. Refer to <u>Instrument Panel Courtesy Lamp Bulb Replacement</u> .

INSTRUMENT PANEL INSULATOR PANEL REPLACEMENT - LEFT SIDE

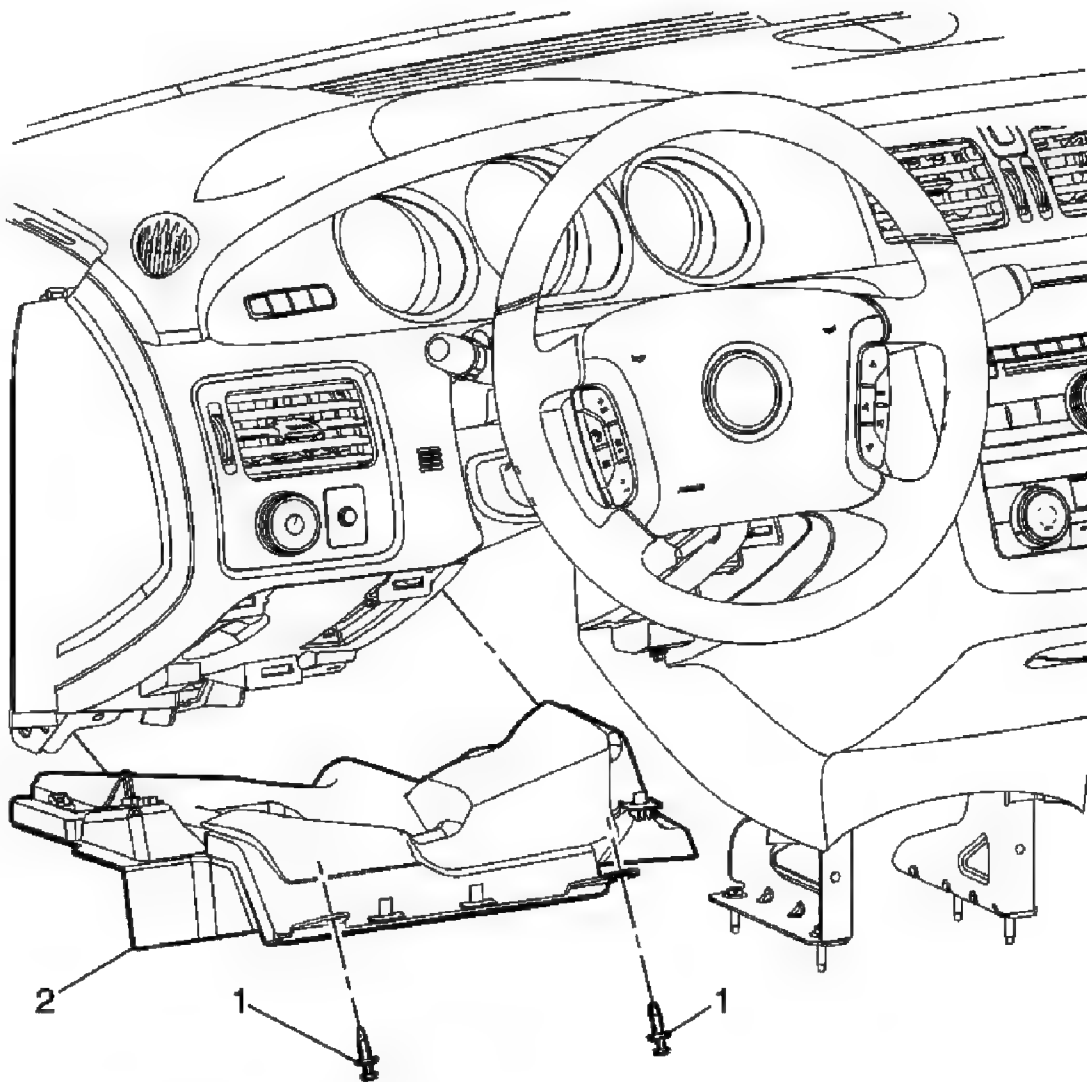


Fig. 18: Locating Left Side Insulator Panel
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Insulator Panel Replacement - Left Side

Callout	Component Name
Preliminary Procedure:	

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Remove the knee bolster. Refer to **Driver Knee Bolster Replacement**.

- | | |
|---|--|
| 1 | Push Pin Retainers (Qty: 2) |
| 2 | Instrument Panel Insulator Assembly
Tip: Remove the courtesy lamp from the insulator panel. Refer to <u>Instrument Panel Courtesy Lamp Bulb Replacement</u> . |

DRIVER KNEE BOLSTER REPLACEMENT

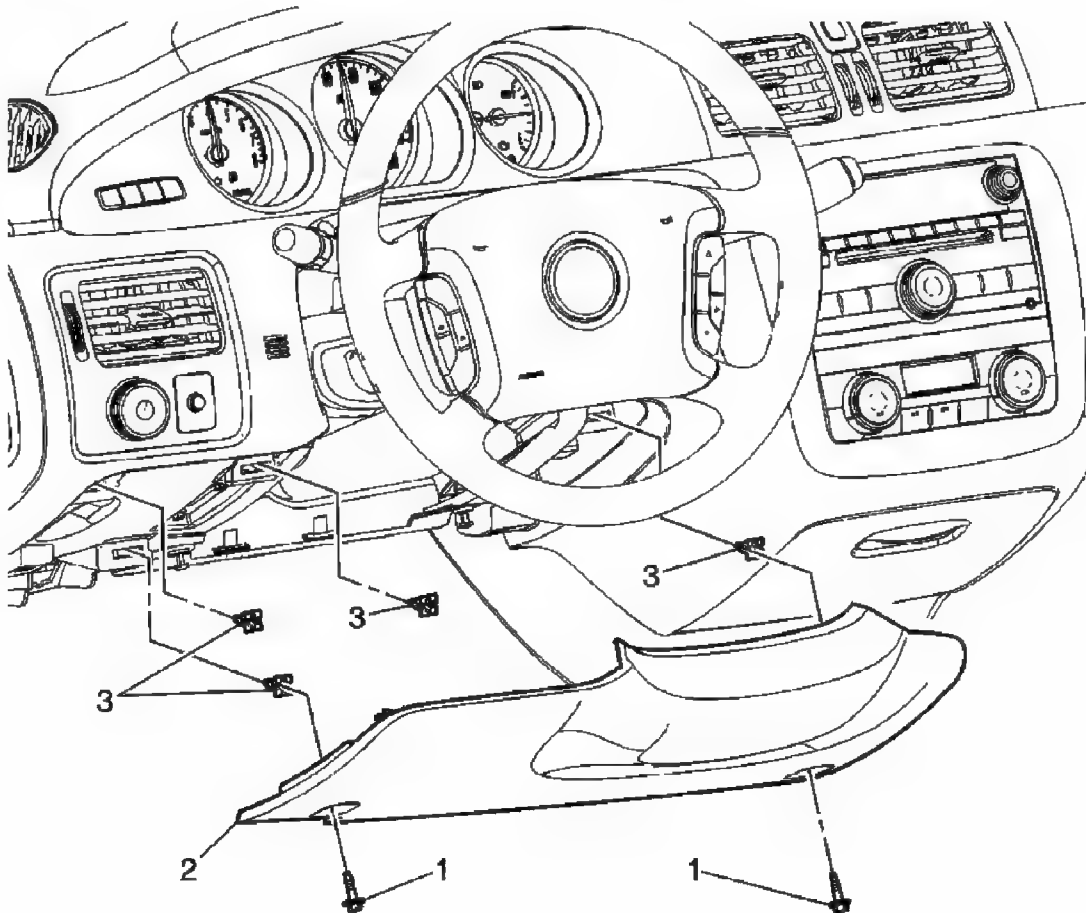


Fig. 19: View Of Driver Knee Bolster
Courtesy of GENERAL MOTORS CORP.

Driver Knee Bolster Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Knee Bolster Assembly Screws (Qty: 2)

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	Tighten: 2 N.m (18 lb in)
2	Knee Bolster Assembly
3	Retainer Clips (Qty: 4)

INSTRUMENT PANEL TRIM PLATE REPLACEMENT

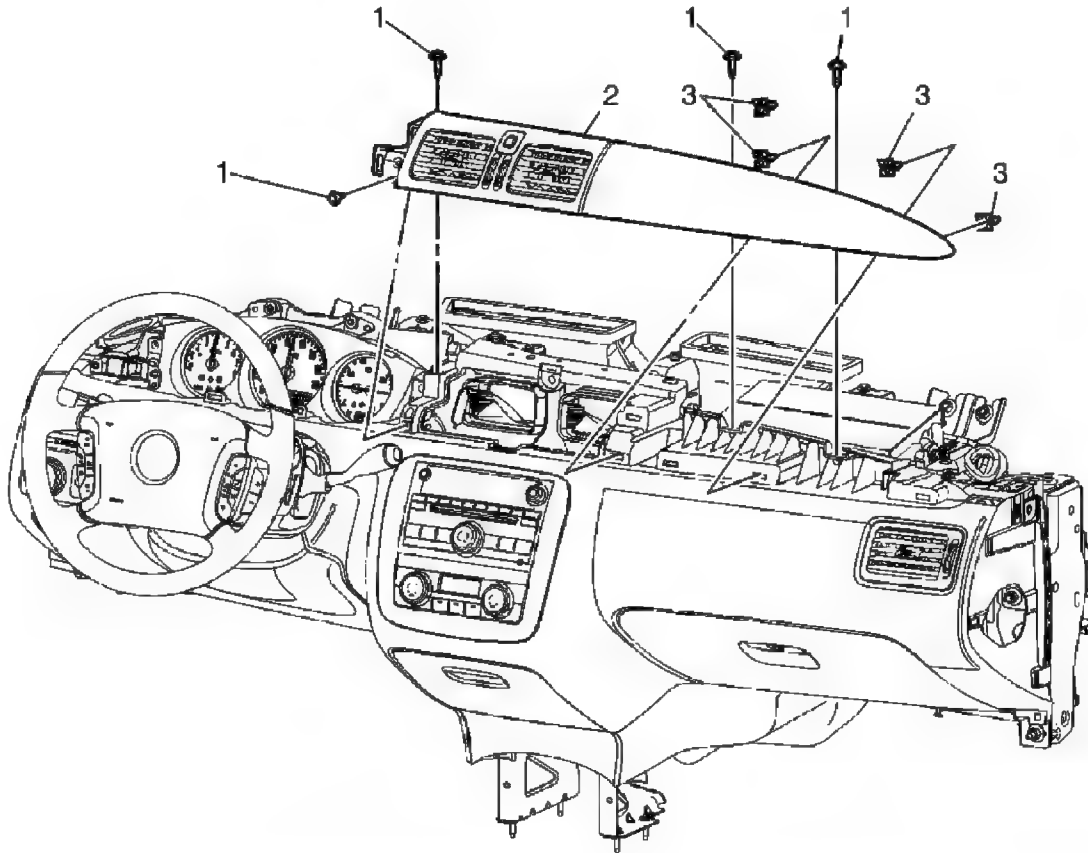


Fig. 20: Removing/Installing Instrument Panel Trim Plat
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Trim Plate Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Preliminary Procedures	
1. Remove the instrument panel outer trim covers. Refer to <u>Instrument Panel Outer Trim Cover Replacement</u> .	

2. Remove the instrument panel upper trim pad. Refer to **Instrument Panel Upper Trim Pad Replacement**.
3. Remove the instrument panel cluster trim panel. Refer to **Instrument Panel Cluster Trim Plate Bezel Replacement**.

1	Instrument Panel Trim Panel Screws (Qty: 4) Tighten: 2 N.m (18 lb in)
2	Instrument Panel Trim Panel Assembly
3	Retainer Clips (Qty: 4)

INSTRUMENT PANEL CENTER TRIM PANEL REPLACEMENT

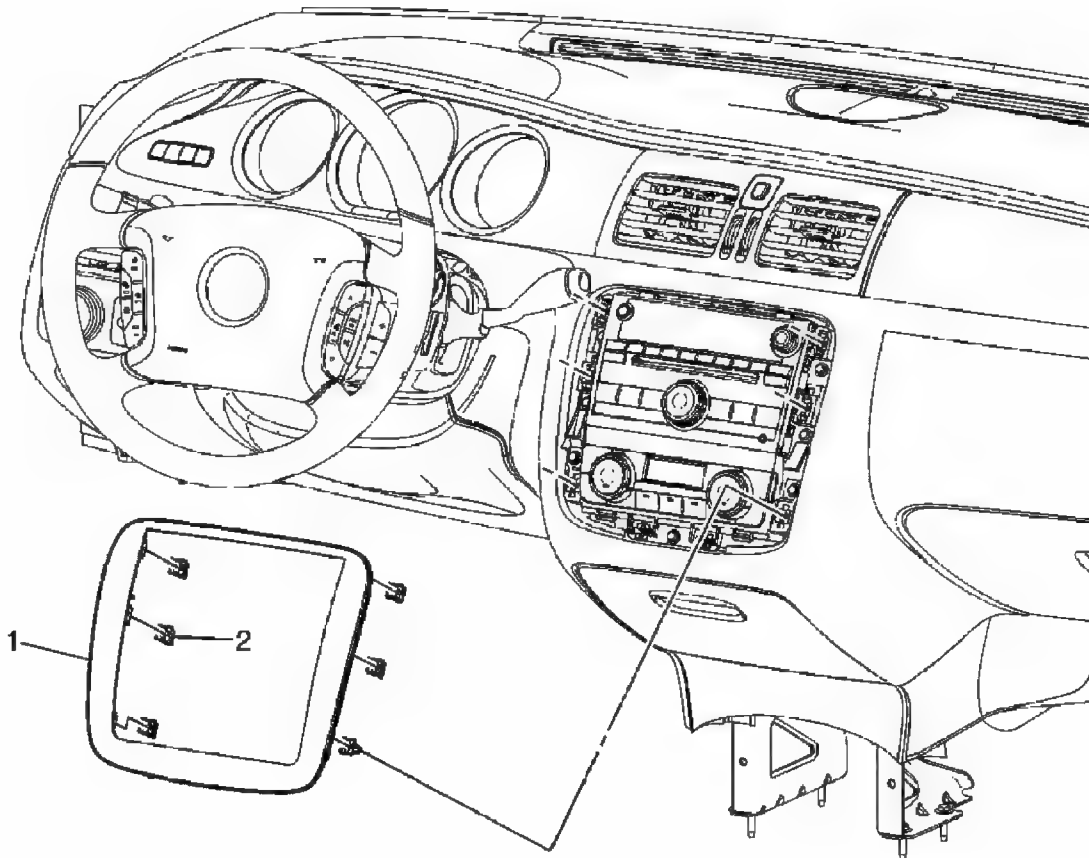


Fig. 21: Locating Instrument Panel Center Trim Panel
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Center Trim Panel Replacement

Callout	Component Name
1	Instrument Panel (I/P) Center Trim Plate Tip: Use a flat-bladed plastic trim tool to remove the center trim plate from the I/P assembly.

2

Retainer Clip (Qty: 8)

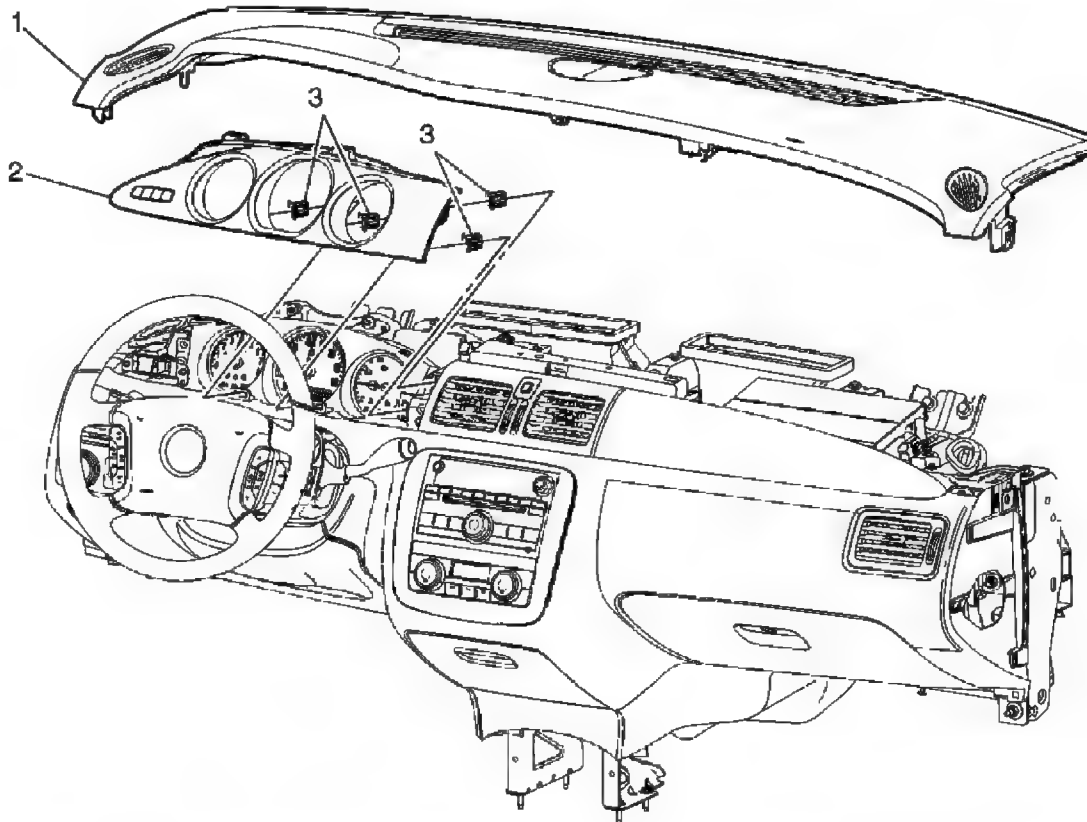
INSTRUMENT PANEL CLUSTER TRIM PLATE BEZEL REPLACEMENT

Fig. 22: Identifying Instrument Panel Cluster Trim Plate Bezel
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Cluster Trim Plate Bezel Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Instrument Panel Upper Trim Pad Refer to <u>Instrument Panel Upper Trim Pad Replacement</u> .
2	Instrument Panel Cluster Trim Plate Bezel. Tip: Disconnect the electrical connectors.
3	Retainer Clips (Qty: 4)

INSTRUMENT PANEL OUTER TRIM COVER REPLACEMENT

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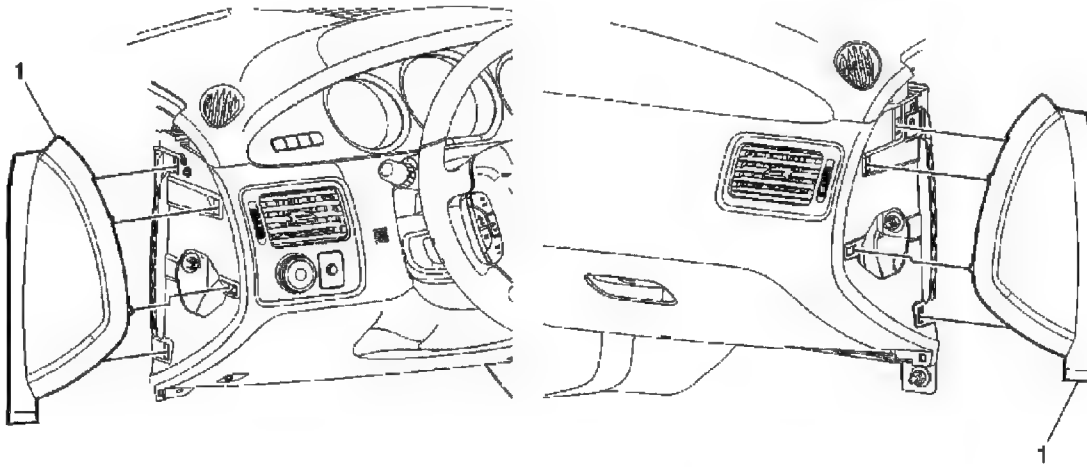


Fig. 23: Identifying Instrument Panel Outer Trim Cover
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Outer Trim Cover Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Instrument Panel Outer Trim Cover (Right or Left)

INSTRUMENT PANEL COMPARTMENT REPLACEMENT

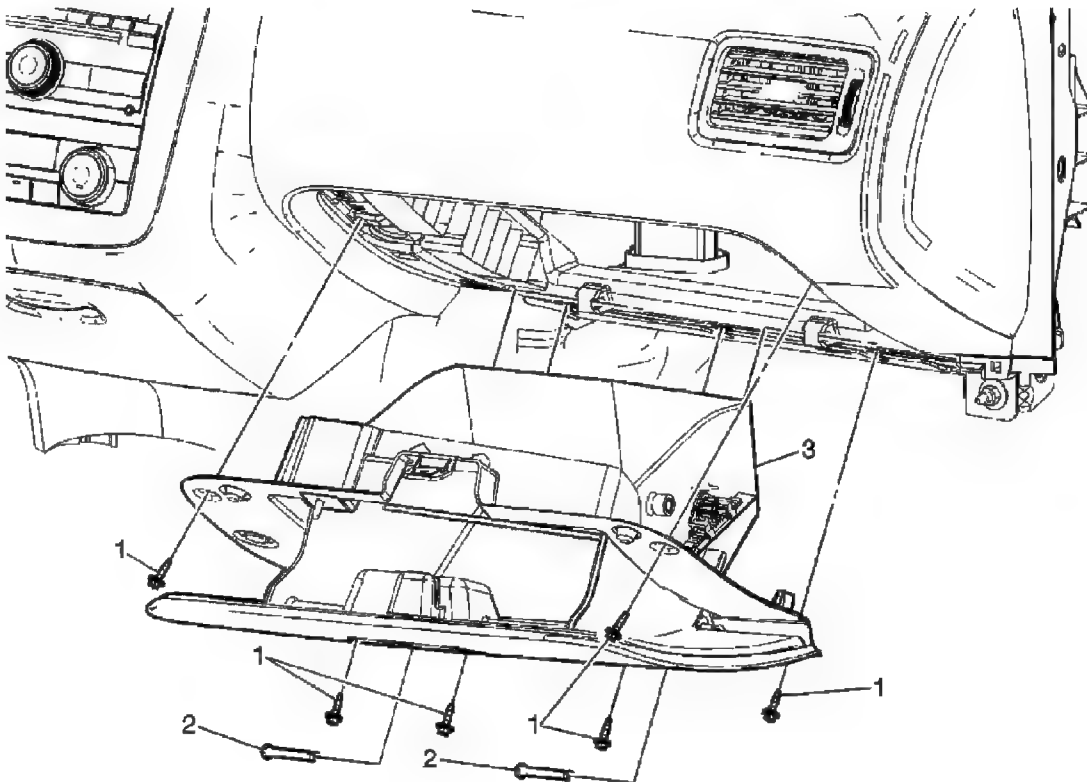


Fig. 24: Removing/Installing Instrument Panel Compartment
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Compartment Replacement

Callout	Component Name
Preliminary Procedure: Remove the right instrument panel closeout/insulator panel. Refer to <u>Instrument Panel Insulator Panel Replacement - Right Side</u> .	
1	Instrument Panel Compartment Assembly Screws (Qty: 6) NOTE: Refer to <u>Fastener Notice</u> . Tip: Remove the hinge pins. Tighten: 2 N.m (18 lb in)
2	Instrument Panel Compartment Hinge Pins (Qty 2)
3	Instrument Panel Compartment Assembly Tip: Disconnect the electrical connections.

INSTRUMENT PANEL COMPARTMENT DOOR LOCK STRIKER REPLACEMENT

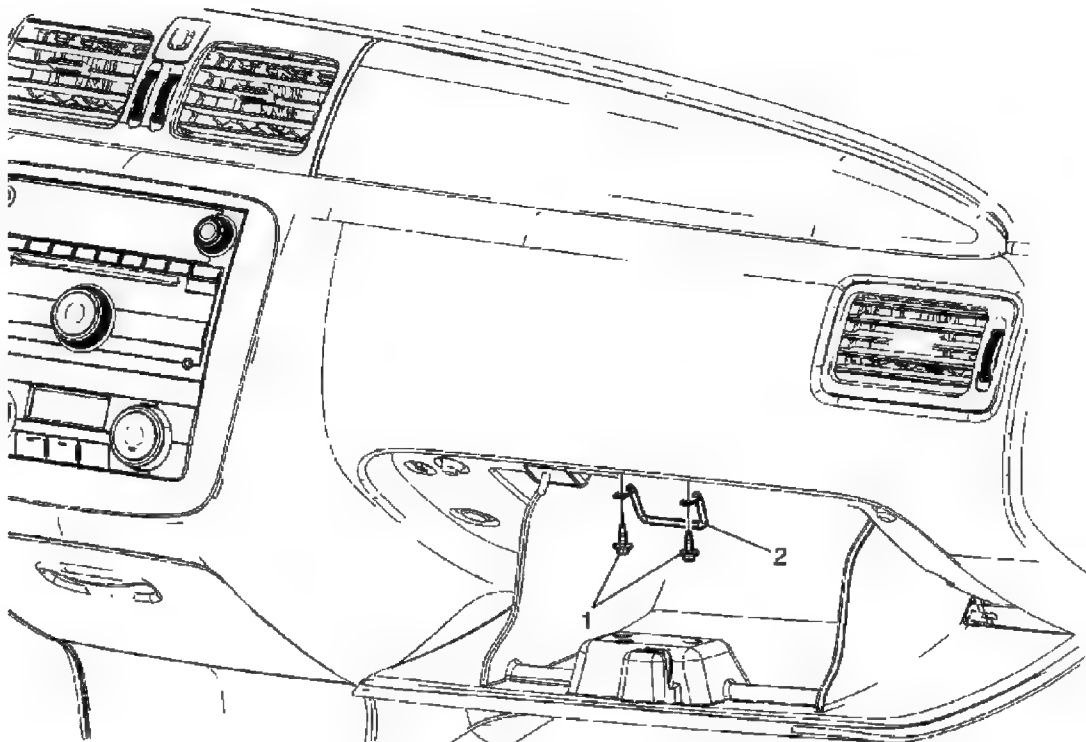


Fig. 25: Locating Instrument Panel Compartment Door Lock Striker
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Compartment Door Lock Striker Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Instrument Panel Compartment Striker Screws (Qty: 2) Tighten: 2 N.m (18 lb in)
2	Instrument Panel Compartment Striker

INSTRUMENT PANEL COMPARTMENT DOOR REPLACEMENT

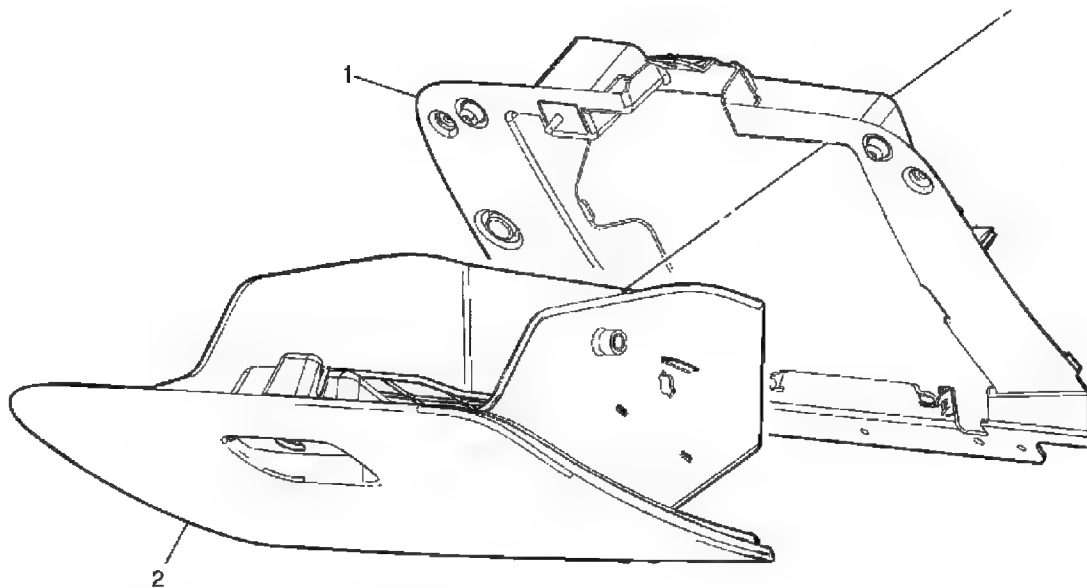


Fig. 26: Identifying Instrument Panel Compartment Door
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Compartment Door Replacement

Callout	Component Name
Preliminary Procedure: Remove the instrument panel compartment door dampener. Refer to <u>Instrument Panel Compartment Door Dampener Replacement</u>	
1	Instrument Panel Compartment Assembly Refer to <u>Instrument Panel Compartment Replacement</u>

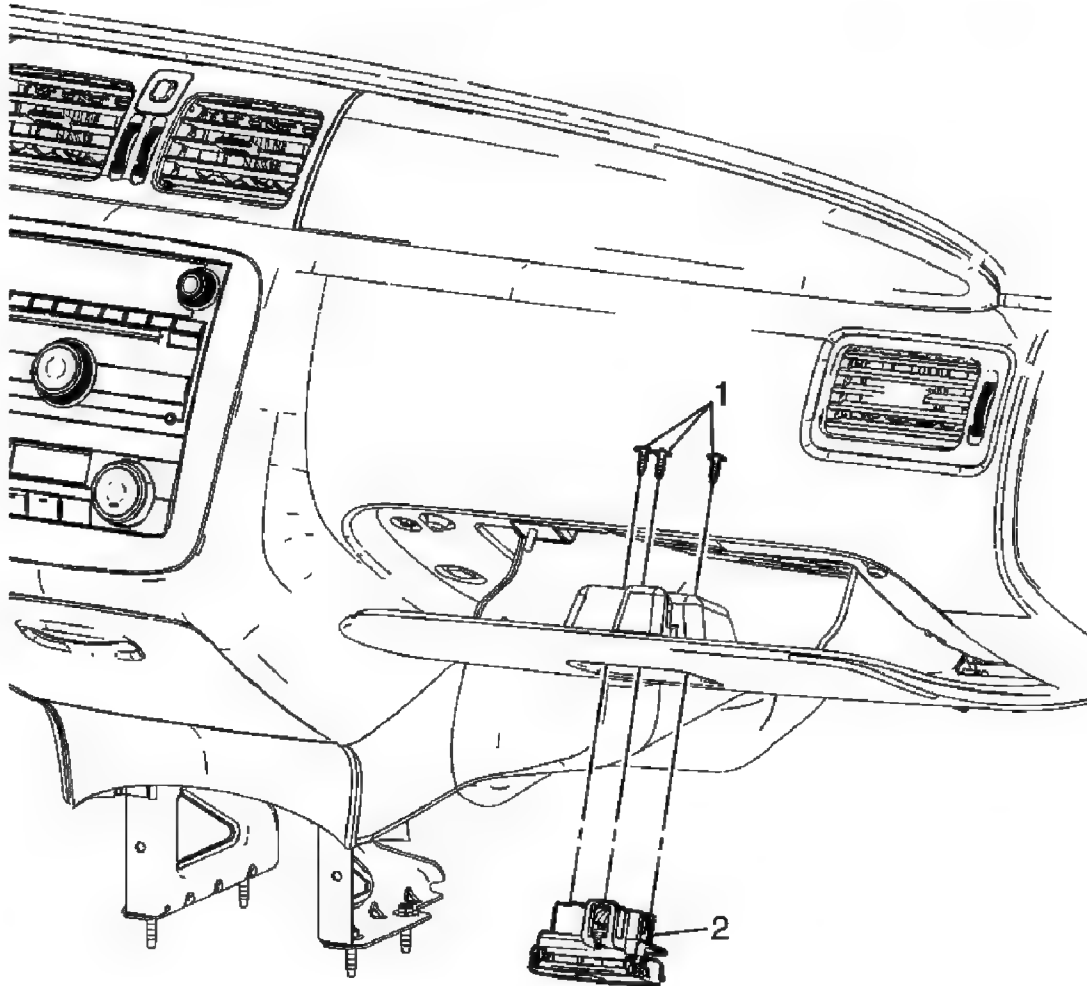
INSTRUMENT PANEL COMPARTMENT DOOR LATCH REPLACEMENT

Fig. 27: Locating Instrument Panel Compartment Door Latch
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Compartment Door Latch Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Instrument Panel Compartment Latch Assembly Screws (Qty: 3) Tighten: 2 N.m (18 lb in)
2	Instrument Panel Compartment Latch Assembly

INSTRUMENT PANEL COMPARTMENT DOOR LOCK CYLINDER REPLACEMENT

Removal Procedure

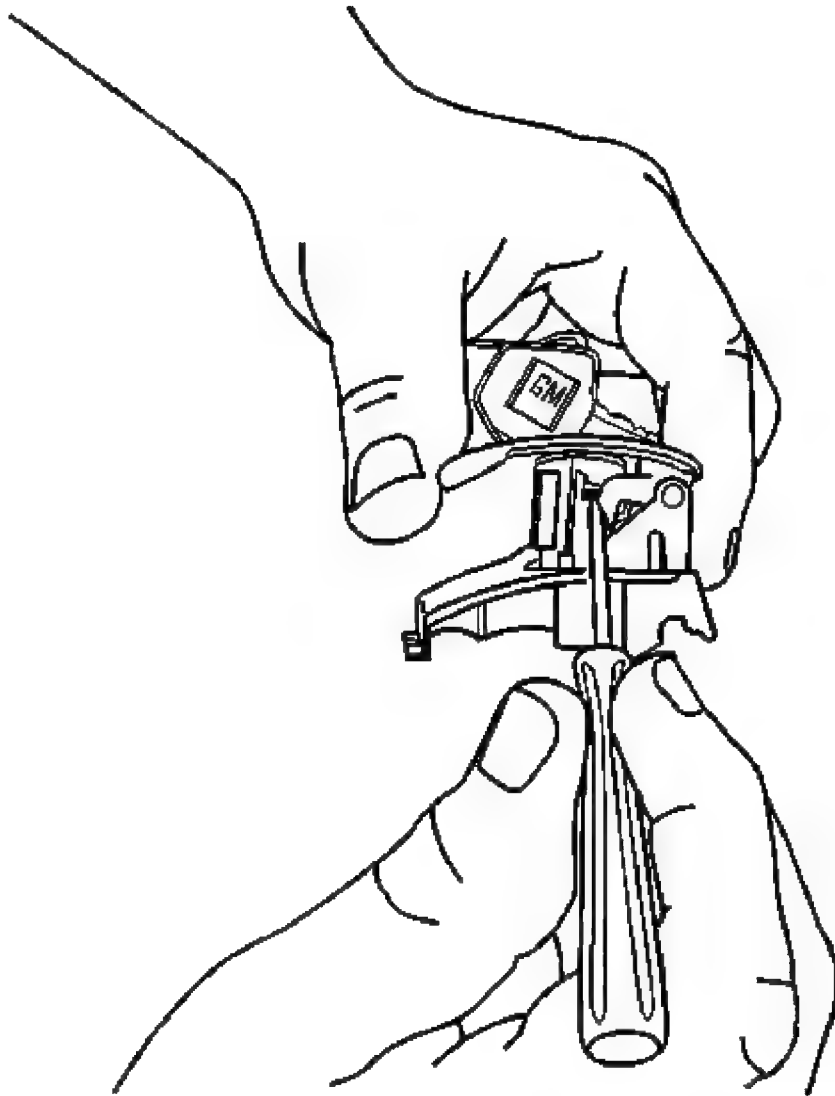


Fig. 28: Depressing Retainer Tumbler Through Poke Hole
Courtesy of GENERAL MOTORS CORP.

1. Remove the instrument panel compartment latch. Refer to **Instrument Panel Compartment Door Latch Replacement**.
2. Position the instrument panel compartment latch fork bolt in the up position.

3. Insert the key into the instrument panel compartment lock cylinder.
4. Rotate the instrument panel compartment lock cylinder clockwise to the 3 o'clock position with the key.
5. With the key in position, apply a light load and depress the retainer tumbler through the poke hole at the right hand side of the instrument panel compartment latch.

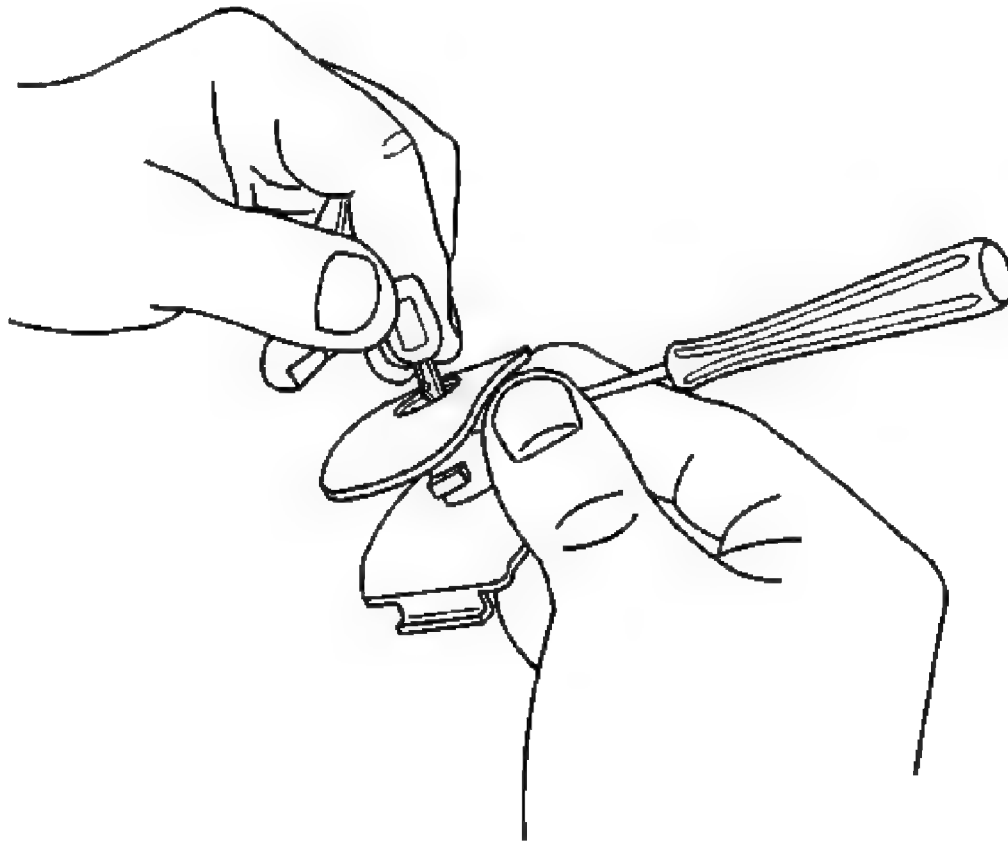


Fig. 29: Rotating Key To 5 O'Clock
Courtesy of GENERAL MOTORS CORP.

6. Rotate the key until the instrument panel compartment lock cylinder rotates to about the 5 o'clock position.

This will line up the notch at the rear of the instrument panel compartment lock cylinder with the tab in the instrument panel compartment latch housing.

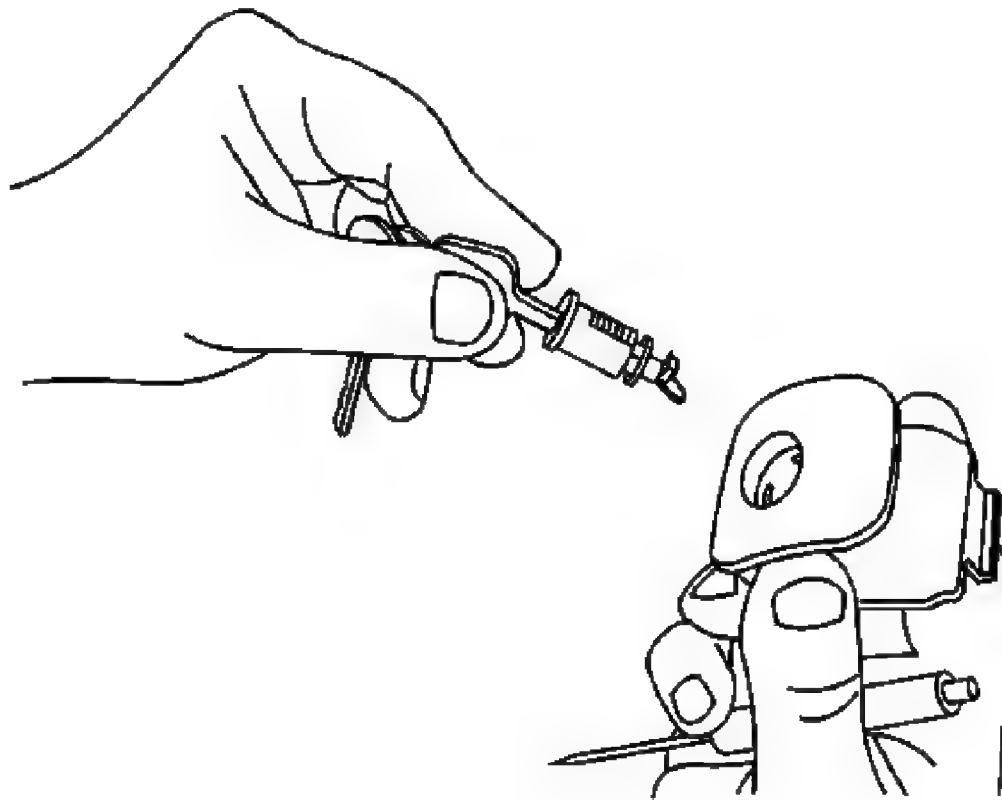


Fig. 30: Removing/Installing I/P Compartment Door Lock Cylinder
Courtesy of GENERAL MOTORS CORP.

7. Remove the instrument panel compartment lock cylinder from the instrument panel compartment latch by pulling on the key.

Installation Procedure

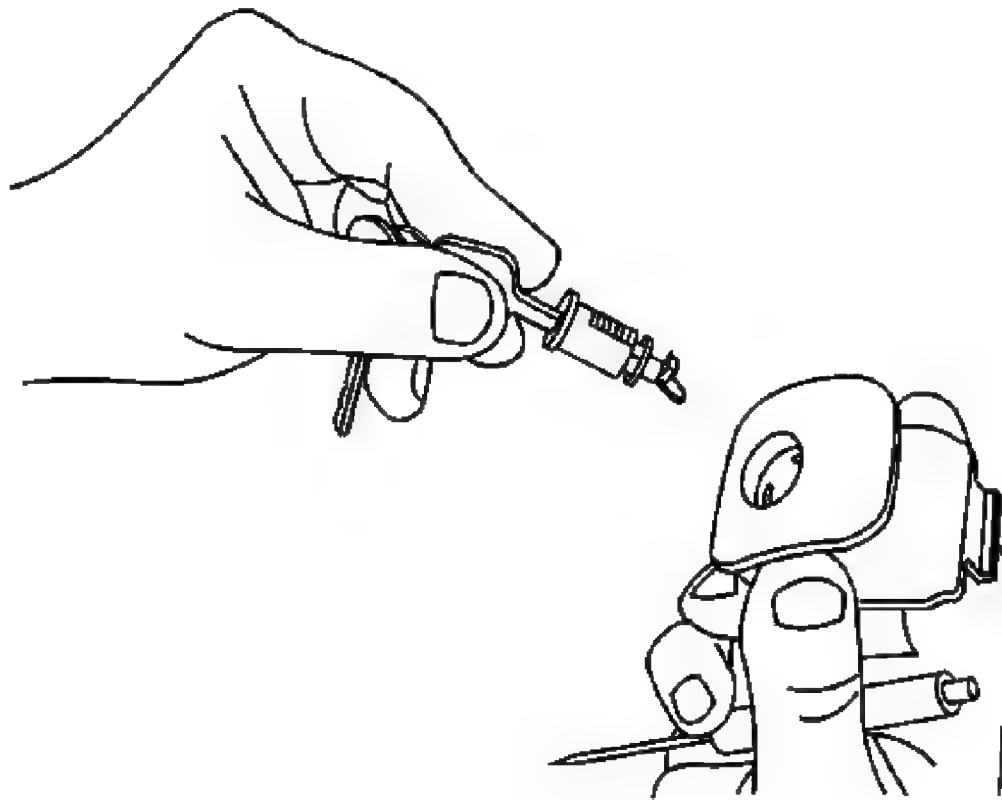


Fig. 31: Removing/Installing I/P Compartment Door Lock Cylinder
Courtesy of GENERAL MOTORS CORP.

1. Position the instrument panel compartment latch fork bolt in the up position.
2. Grasp the instrument panel compartment lock cylinder. Depress the rear-most, light-colored tumbler that is flush with the instrument panel compartment lock cylinder surface.
3. Insert the key.

All the tumblers will now stay depressed.

4. Insert the instrument panel compartment lock cylinder, with the key inserted, into the instrument panel compartment latch housing. Ensure that the front projection pin is at the appropriate 8 o'clock position.

The instrument panel compartment lock cylinder will drop into place.

5. Rotate the key counterclockwise until the key stops.

6. Remove the key, the tumblers will now release.

The instrument panel compartment lock cylinder is now locked into the instrument panel compartment latch housing.

7. Install the instrument panel compartment latch. Refer to **Instrument Panel Compartment Door Latch Replacement**.

DEFROSTER GRILLE REPLACEMENT

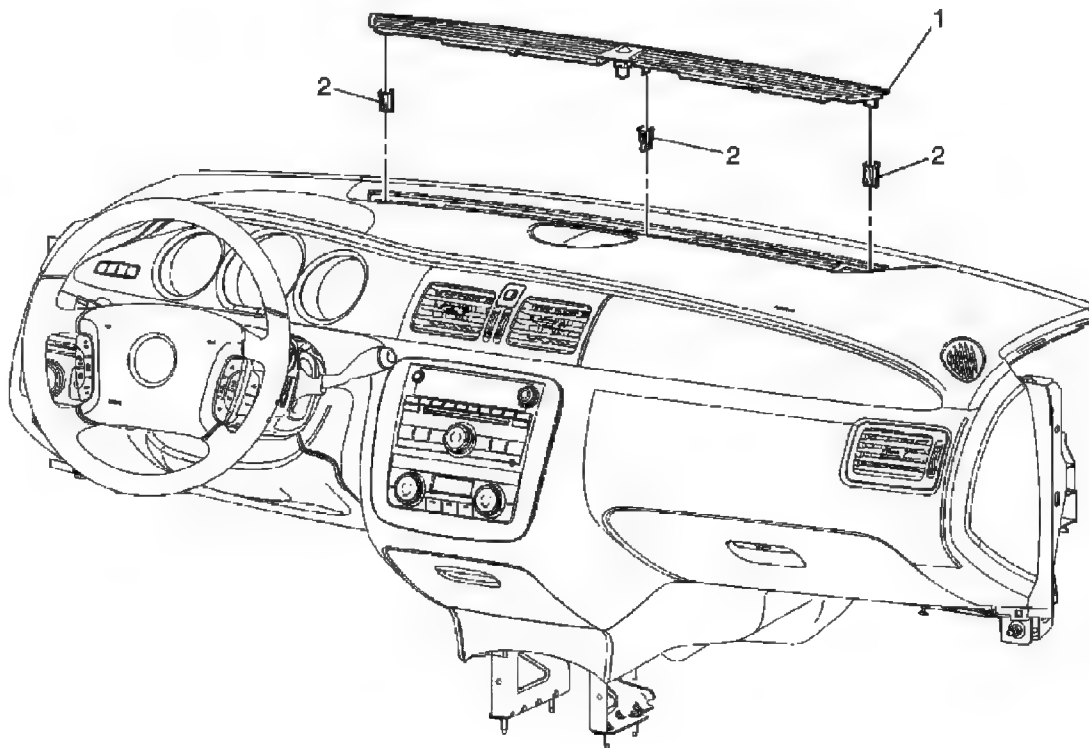


Fig. 32: Identifying Defroster Grille
 Courtesy of GENERAL MOTORS CORP.

Defroster Grille Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Instrument Panel Defroster Grill Panel Tip: <ol style="list-style-type: none"> 1. Use a flat-bladed plastic trim tool to remove the defroster grill panel from the instrument panel assembly. 2. Remove the ambient light sensor from the defroster grill.

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	Refer to <u>Ambient Light Sensor Replacement</u> .
2	Retainer Clips (Qty: 3)

INSTRUMENT PANEL COMPARTMENT DOOR DAMPENER REPLACEMENT

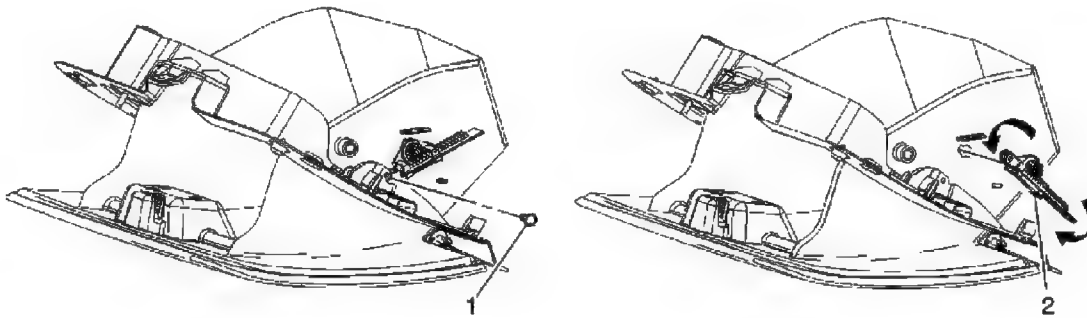


Fig. 33: Locating Instrument Panel Compartment Door Dampener
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Compartment Door Dampener Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Preliminary Procedure: Remove the Instrument Panel Compartment Assembly. Refer to <u>Instrument Panel Compartment Replacement</u> .	
1	Instrument Panel Compartment Dampener Retaining Pin (Qty: 1)
2	Instrument Panel Compartment Dampener Assembly Tip: Twist the dampener assembly to remove from the compartment assembly.

INSTRUMENT PANEL UPPER TRIM PAD REPLACEMENT

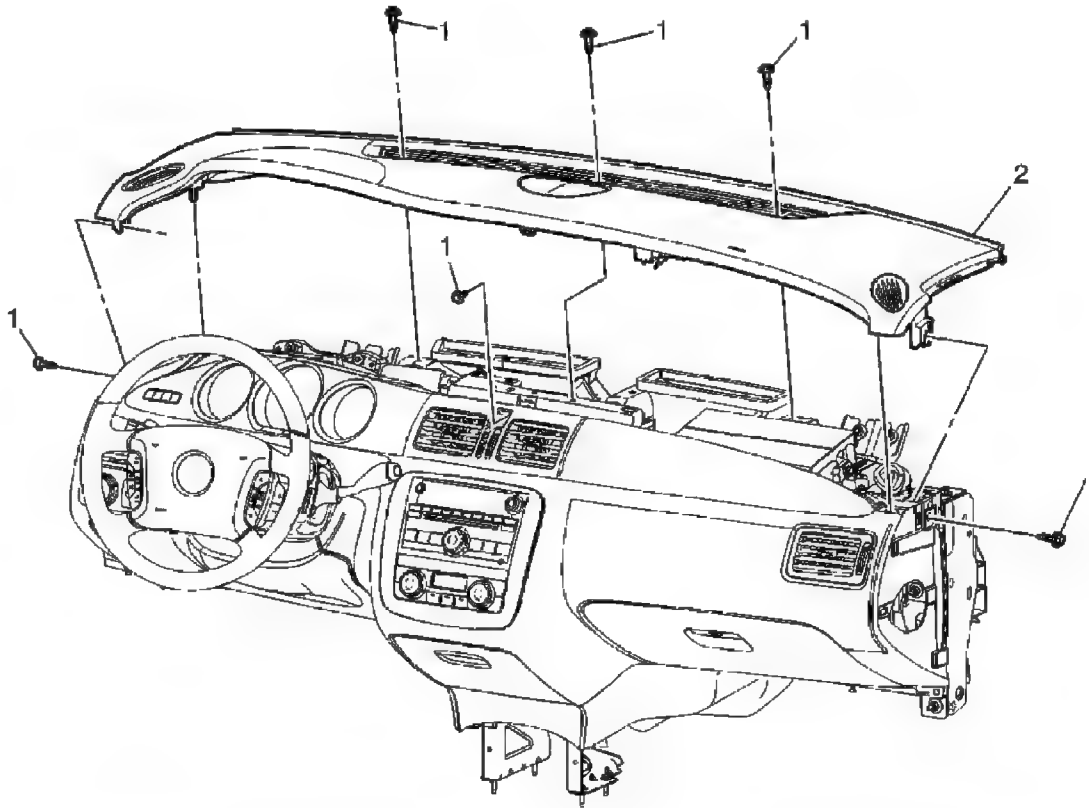


Fig. 34: Removing/Installing Instrument Panel Upper Trim Pad
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Upper Trim Pad Replacement

Callout	Component Name
Preliminary Procedures	
<ol style="list-style-type: none"> 1. Remove the windshield garnish moldings. Refer to <u>Windshield Pillar Garnish Molding Replacement</u> . 2. Remove the instrument panel outer trim covers. Refer to <u>Instrument Panel Outer Trim Cover Replacement</u>. 3. Remove the instrument panel defroster grill. Refer to <u>Defroster Grille Replacement</u>. 4. Remove the hazard lamp switch. Refer to <u>Hazard Warning Switch Replacement</u> . 	
1	Instrument Panel Upper Trim Pad Screws (Qty: 6) NOTE: Refer to <u>Fastener Notice</u> . Tighten: 9 N.m (80 lb in)

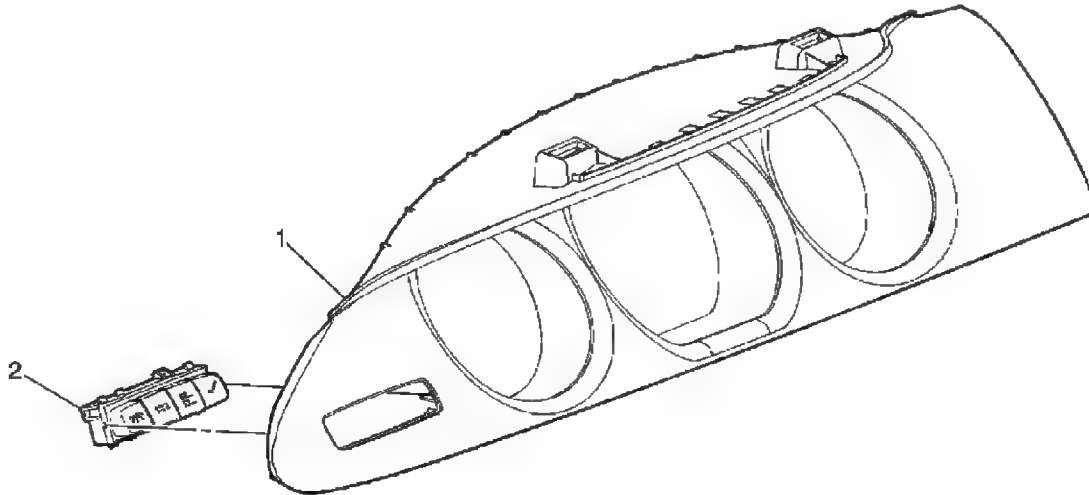
DRIVER INFORMATION DISPLAY SWITCH REPLACEMENT

Fig. 35: Identifying Driver Information Display Switch
Courtesy of GENERAL MOTORS CORP.

Driver Information Display Switch Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Instrument Panel Cluster Trim Plate Bezel Refer to <u>Instrument Panel Cluster Trim Plate Bezel Replacement</u>
2	Drivers Information Center Switch Assembly

INSTRUMENT CLUSTER REPLACEMENT

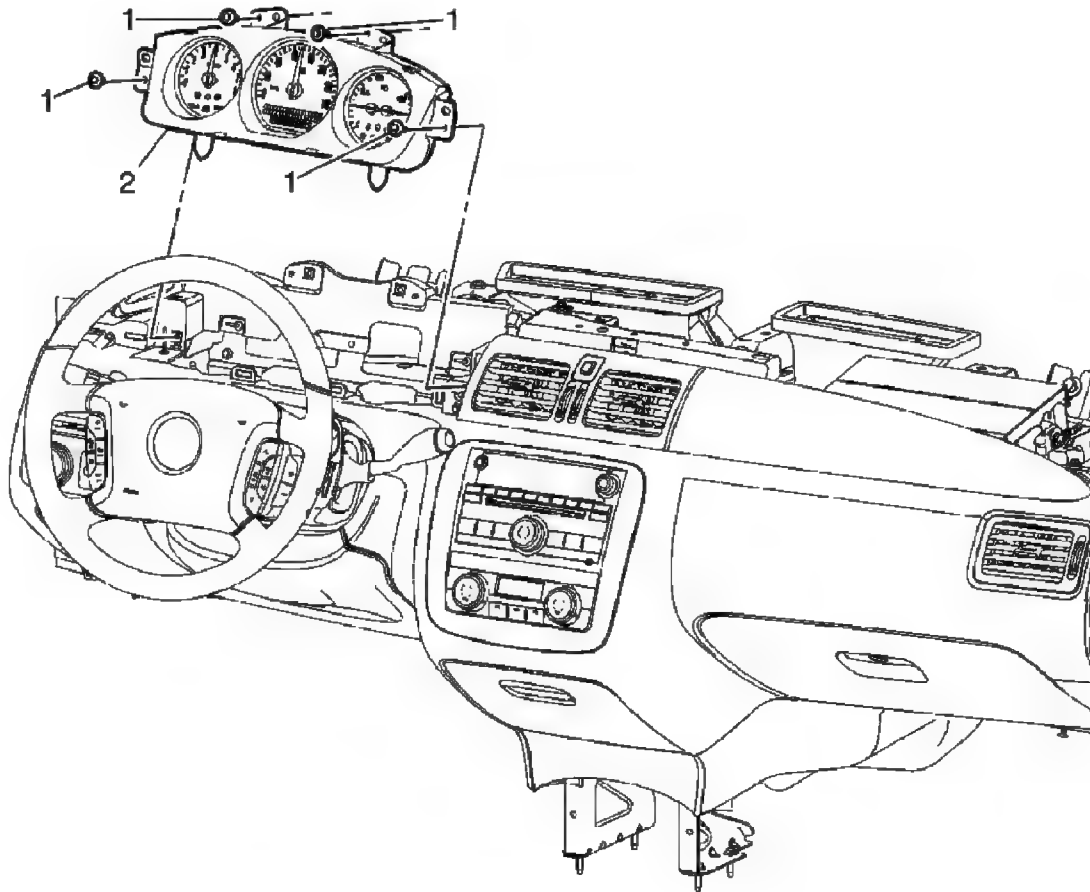


Fig. 36: Removing/Installing Instrument Cluster
Courtesy of GENERAL MOTORS CORP.

Instrument Cluster Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . Preliminary Procedure: Remove the instrument panel cluster trim plate. Refer to <u>Instrument Panel Cluster Trim Plate Bezel Replacement</u> .	
1	Instrument Panel Cluster Assembly Screws (Qty: 4) Tighten: 2 N.m (18 lb in)
2	Instrument Panel Cluster Assembly Tip: Disconnect the electrical connection. Refer to <u>Control Module References</u> for programming and setup information.

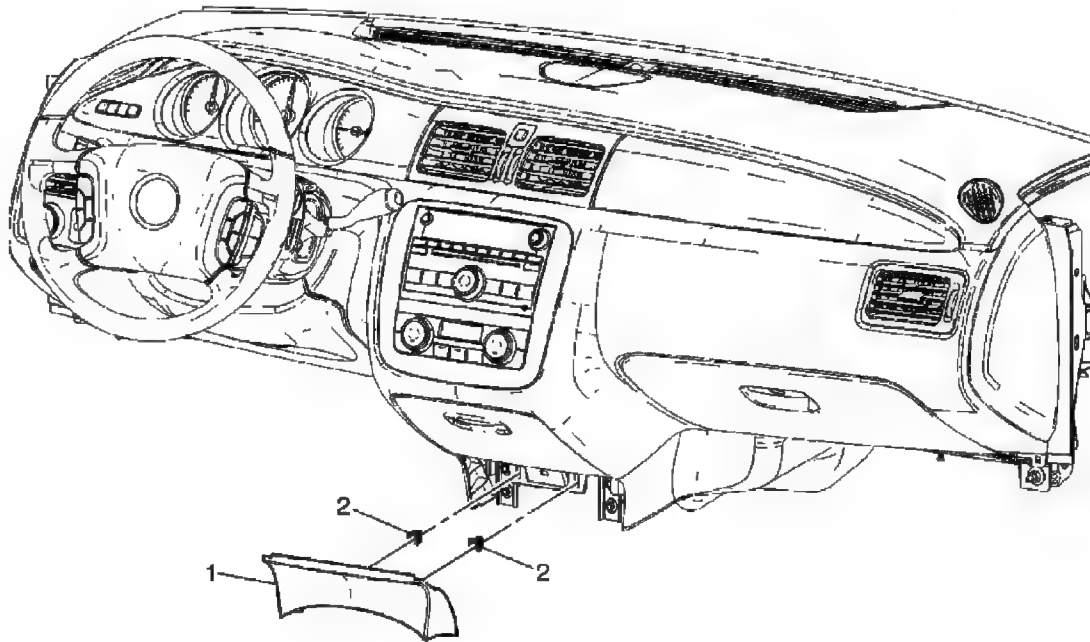


Fig. 37: Identifying Ashtray Side Panel
 Courtesy of GENERAL MOTORS CORP.

Ashtray Side Panel Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Ashtray Side Panel
2	Retainer Clips (Qty: 2)

ASHTRAY REPLACEMENT

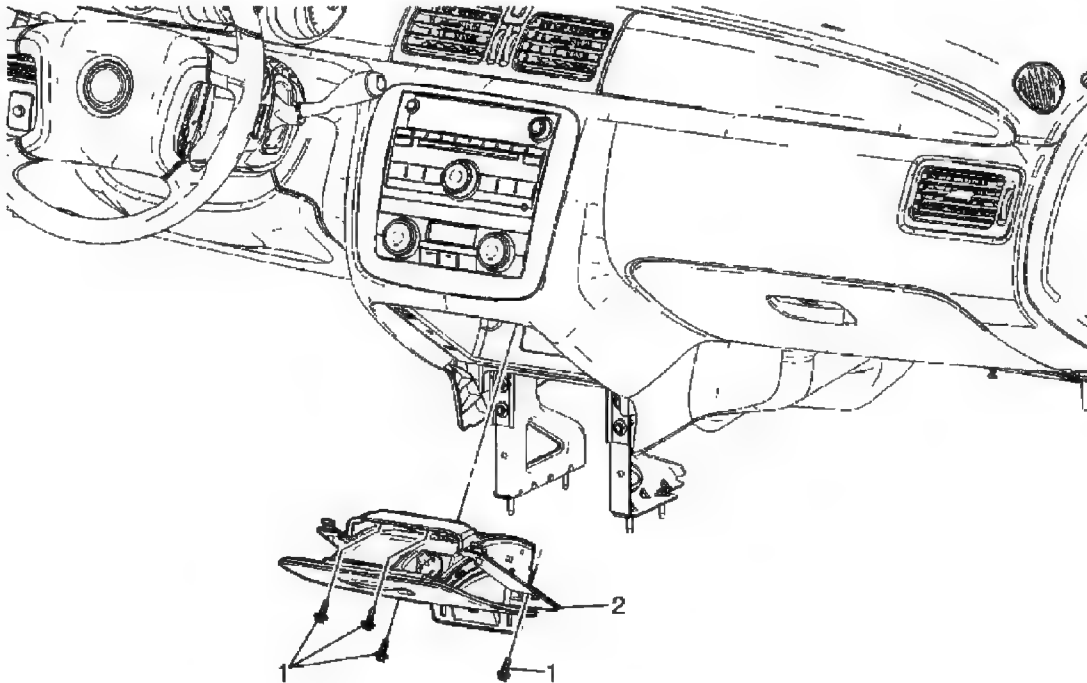


Fig. 38: Removing/Installing Ashtray
Courtesy of GENERAL MOTORS CORP.

Ashtray Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Preliminary Procedure: Remove the Ashtray Side Panel. Refer to <u>Ashtray Side Panel Replacement</u> .	
1	Ashtray Assembly Screws (Qty: 4) Tighten: 2 N.m (18 lb in)
2	Ashtray Assembly Tip: Disconnect the electrical connections.

INSTRUMENT PANEL LOWER TRIM PANEL REPLACEMENT

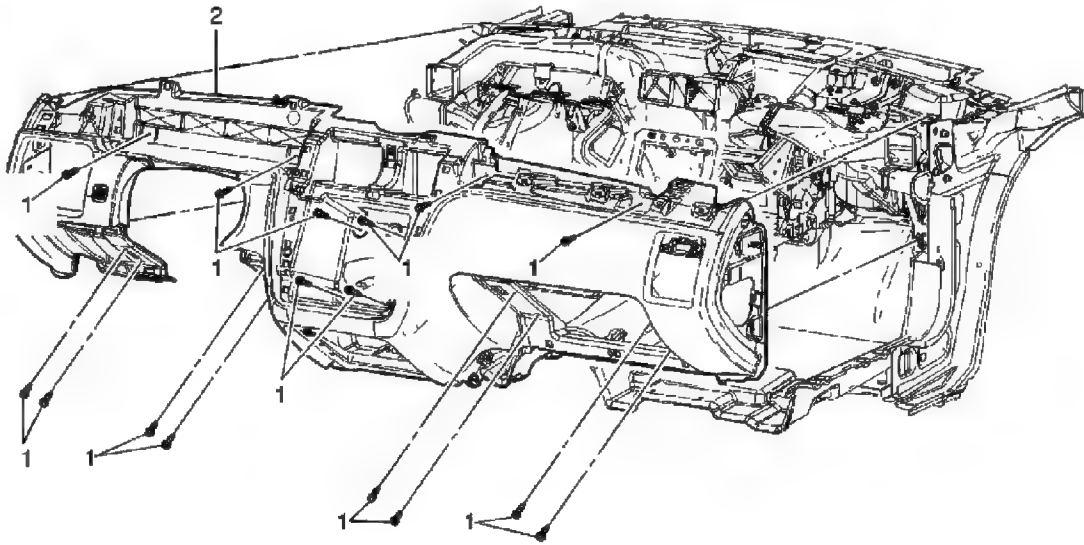


Fig. 39: View Of Lower Instrument Panel (I/P) Trim Panel
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Lower Trim Panel Replacement

Callout	Component Name
Preliminary Procedures	
<ol style="list-style-type: none"> 1. Remove the instrument panel cluster assembly. Refer to <u>Instrument Cluster Replacement</u>. 2. Remove the steering column. Refer to <u>Steering Column Replacement</u>. 3. Remove the instrument panel compartment. Refer to <u>Instrument Panel Compartment Replacement</u>. 4. Remove the instrument panel ashtray assembly, if equipped. Refer to <u>Ashtray Replacement</u>. 5. Remove the center console, if equipped. Refer to <u>Console Replacement</u>. 6. Remove the radio. Refer to <u>Radio Replacement</u>. 7. Remove the instrument panel left and right air outlets. Refer to <u>Instrument Panel Outer Air Outlet Replacement - Left Side</u> and <u>Instrument Panel Outer Air Outlet Replacement - Right Side</u>. 8. Remove the right and left side window air outlet ducts. Refer to <u>Side Window Air Outlet Replacement</u>. 9. Remove the right and left body hinge pillar trim panels. Refer to <u>Body Hinge Pillar Trim Panel Replacement</u>. 	
	Instrument Panel Lower Panel Bolts (Qty: 18)
	NOTE:

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1	<p>Refer to Fastener Notice .</p> <p>Tighten: 9 N.m (80 lb in)</p>
2	<p>Instrument Panel Lower Panel Assembly</p> <p>Procedures</p> <ol style="list-style-type: none">1. Note the routing of the electric harness prior to removal of the instrument panel lower trim panel assembly to ensure proper reinstallation.2. Disconnect the electrical harness connections.3. With the aid of an assistant, remove the instrument panel lower trim panel from the vehicle.4. When replacing the instrument panel lower trim panel, transfer all necessary components.

INSTRUMENT PANEL CARRIER REPLACEMENT

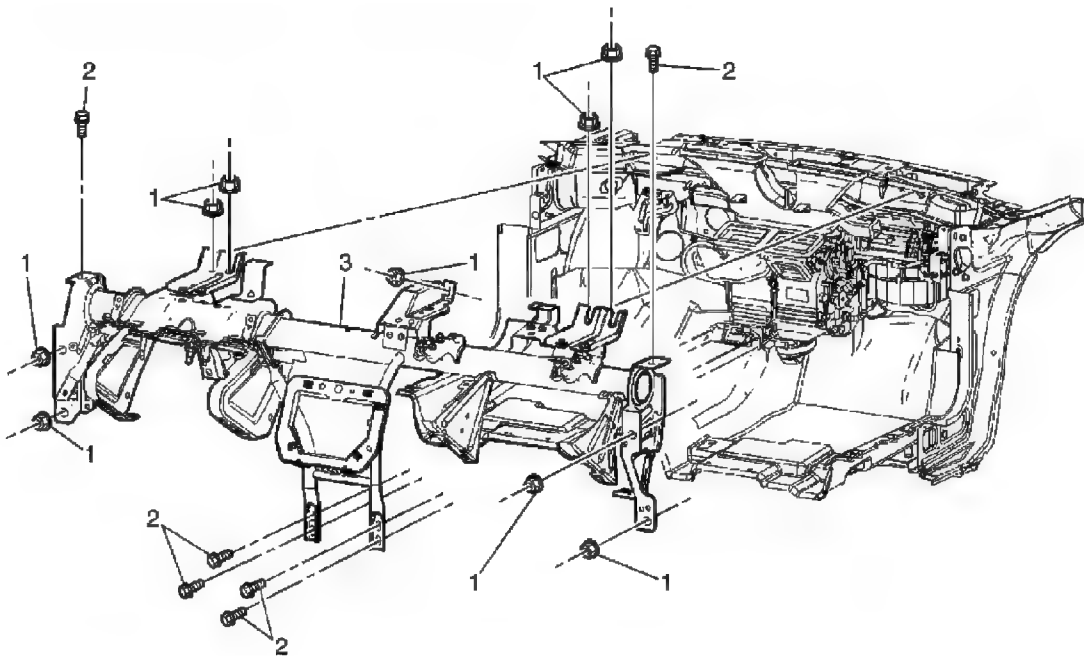


Fig. 40: View Of Instrument Panel (I/P) Carrier
Courtesy of GENERAL MOTORS CORP.

Instrument Panel Carrier Replacement

Callout	Component Name
<p>NOTE: Refer to Fastener Notice .</p>	

Fastener Tightening Specifications: Refer to **Fastener Tightening Specifications.**

Preliminary Procedures

1. Remove the instrument panel lower trim panel. Refer to **Instrument Panel Lower Trim Panel Replacement.**
2. Remove the left air distribution duct. Refer to **Instrument Panel Outer Air Outlet Upper Duct Replacement - Left Side .**
3. Remove the right air distribution duct. Refer to **Instrument Panel Outer Air Outlet Upper Duct Replacement - Right Side .**
4. Remove the center air outlet duct. Refer to **Center Air Outlet Duct Replacement .**
5. Remove the floor air outlet duct. Refer to **Floor Air Outlet Duct Replacement - Right Side .**
6. Remove the left side window defroster outlet duct. Refer to **Side Window Defogger Outlet Duct Replacement - Left Side .**
7. Remove the right side window defroster outlet duct. Refer to **Side Window Defogger Outlet Duct Replacement - Right Side .**
8. Remove the screws securing the windshield defroster nozzle duct to the carrier. Refer to **Defroster Air Outlet Duct Replacement .**

1	Instrument Panel Carrier Assembly Nuts (Qty: 9) Tighten: 25 N.m (18 lb ft)
2	Instrument Panel Carrier Assembly Bolts (Qty: 6) Tighten: 25 N.m (18 lb ft)
3	Instrument Panel Carrier Assembly Tip: <ol style="list-style-type: none"> 1. Note the routing of the electric harness prior to removal of the carrier to aid in the reinstallation. 2. Disconnect the electrical harness connections. 3. With the aid of an assistant, remove the carrier from the vehicle.

FRONT FLOOR CONSOLE COMPARTMENT DOOR LATCH REPLACEMENT

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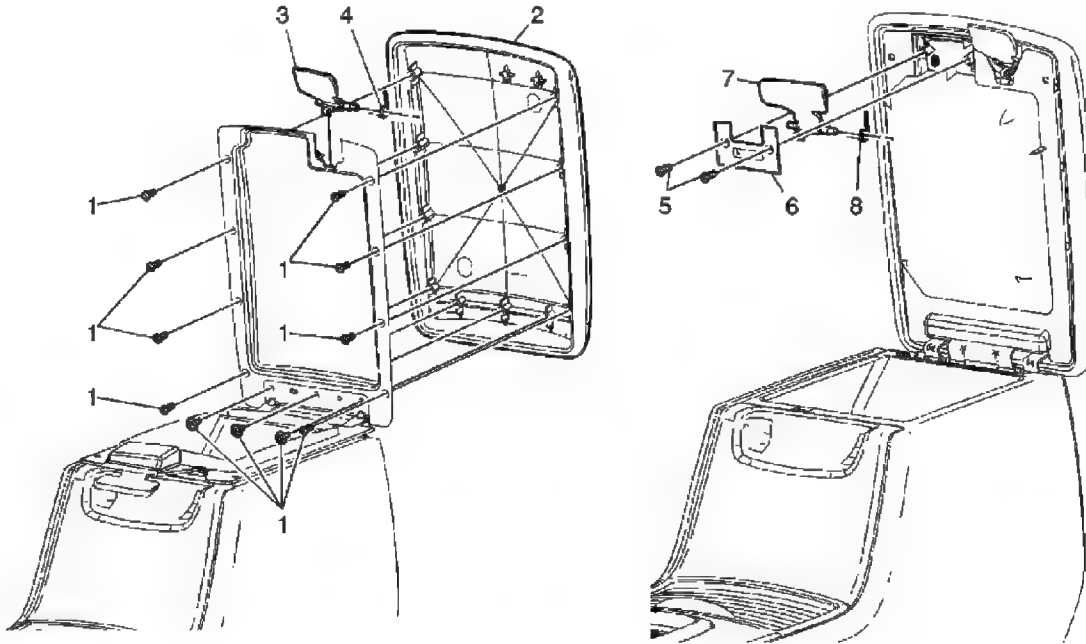


Fig. 41: Identifying Console Compartment Door Latch
Courtesy of GENERAL MOTORS CORP.

Front Floor Console Compartment Door Latch Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Upper Latch Assembly	
1	Screw, Front Floor Console Armrest Cover (Qty: 11) Tighten: 2 N.m (18 lb in)
2	Cover Assembly, Front Floor Console Armrest
3	Latch Assembly, Front Floor Console Armrest Upper
4	Spring, Front Floor Console Armrest Latch
Lower Latch Assembly	
5	Screw, Front Floor Console Armrest Lower Latch Cover (Qty: 2) Tighten: 2 N.m (18 lb in)
6	Cover Assembly, Front Floor Console Armrest Lower Latch
7	Latch Assembly, Front Floor Console Armrest Lower
8	Spring, Front Floor Console Armrest Latch

FRONT FLOOR CONSOLE COMPARTMENT REPLACEMENT

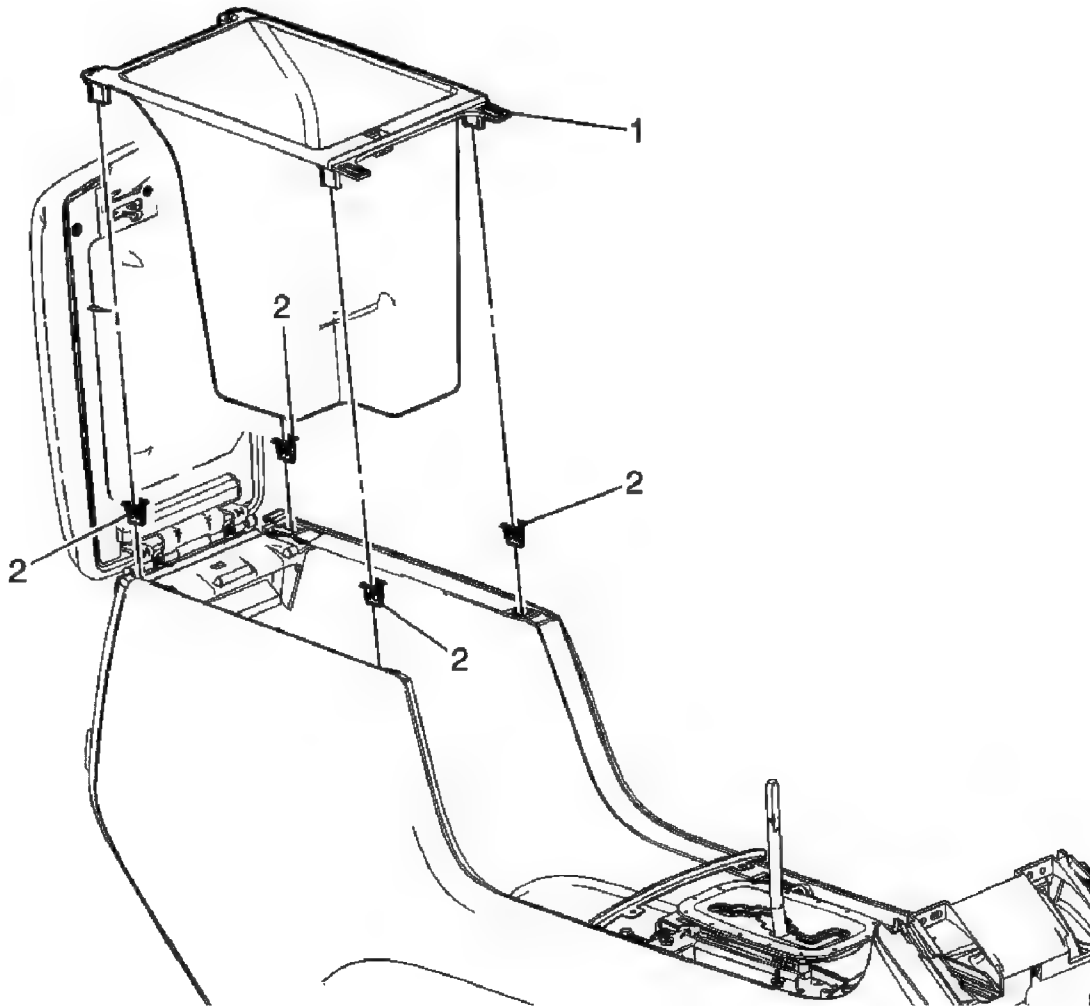


Fig. 42: Removing/Installing Console Storage Bin
Courtesy of GENERAL MOTORS CORP.

Front Floor Console Compartment Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . Preliminary Procedure: Remove the front floor console cupholder. Refer to <u>Front Floor Console Cup Holder Replacement</u> .	
1	Bin Assembly, Front Floor Console. Refer to <u>Instrument Panel Compartment Door Latch Replacement</u> .
2	Clip, Retainer (Qty: 4)

FRONT FLOOR CONSOLE SIDE TRIM PANEL REPLACEMENT - RIGHT SIDE

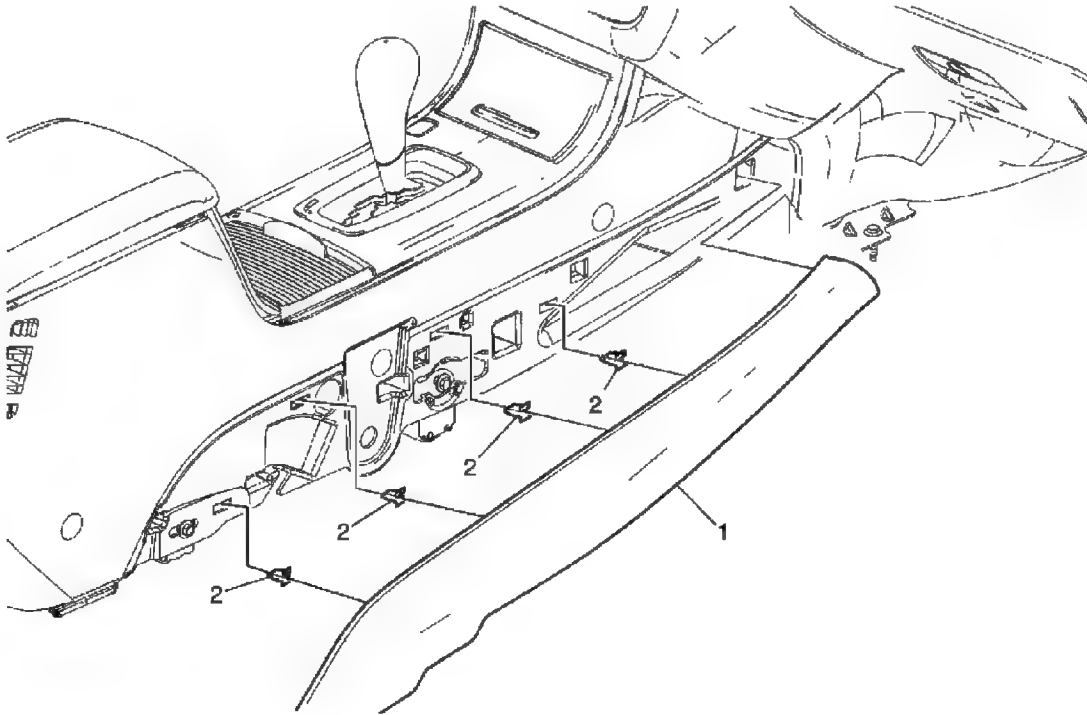


Fig. 43: View Of Console Trim Panel - Right
 Courtesy of GENERAL MOTORS CORP.

Front Floor Console Side Trim Panel Replacement - Right Side

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u>.	
1	Panel Assembly, Front Floor Console Trim
2	Clip, Retainer (Qty: 4)

FRONT FLOOR CONSOLE SIDE TRIM PANEL REPLACEMENT - LEFT SIDE

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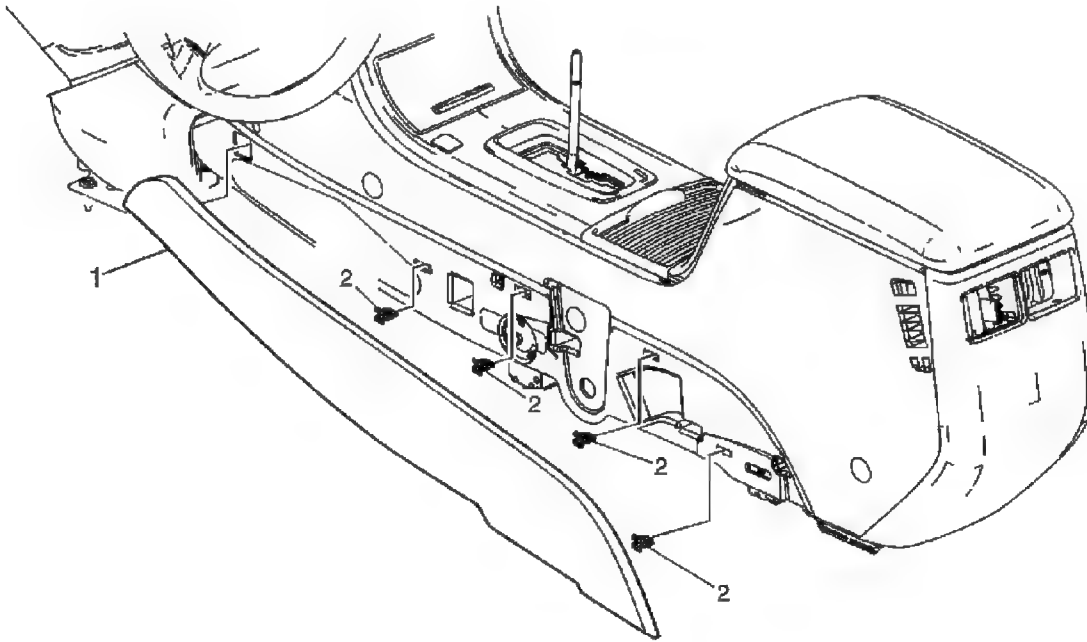


Fig. 44: View Of Console Trim Panel - Left
Courtesy of GENERAL MOTORS CORP.

Front Floor Console Side Trim Panel Replacement - Left Side

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Panel Assembly, Front Floor Console Trim
2	Clip, Retainer (Qty: 4)

FRONT FLOOR CONSOLE FRONT ASHTRAY REPLACEMENT

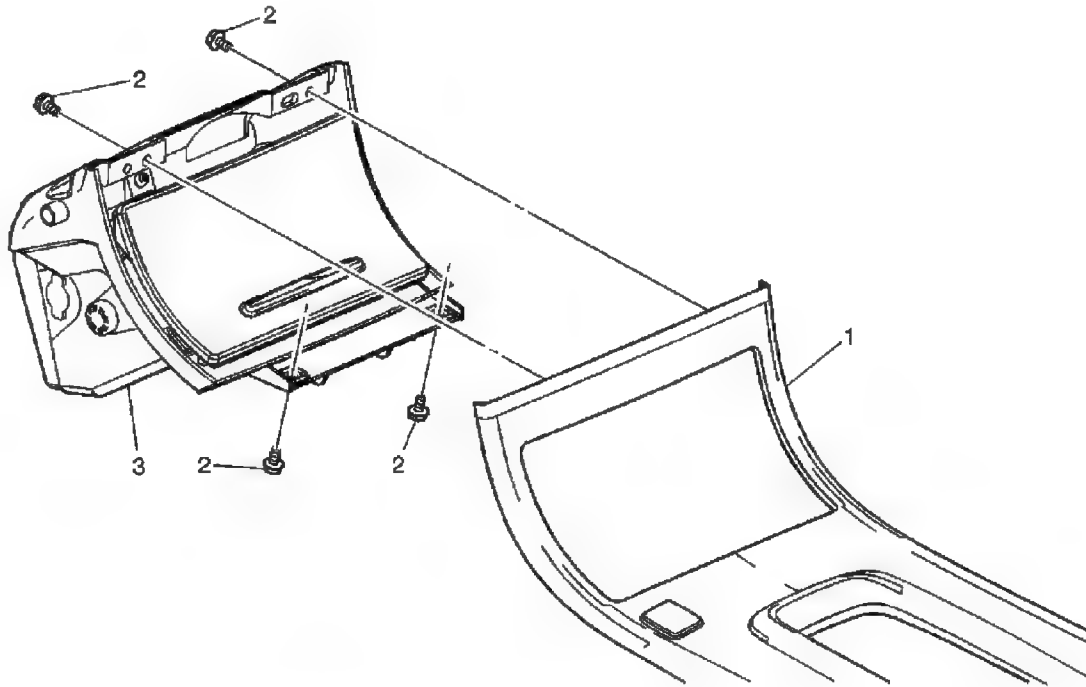


Fig. 45: View Of Ashtray - Floor Console Front
 Courtesy of GENERAL MOTORS CORP.

Front Floor Console Front Ashtray Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Plate Assembly, Front Floor Console Refer to <u>Front Floor Console Trim Plate Replacement</u> .
2	Bolt, Ashtray Assembly (Qty: 4) Tighten: 2 N.m (18 lb in)
3	Ashtray Assembly, Console

CONSOLE SHIFT LEVER BEZEL REPLACEMENT

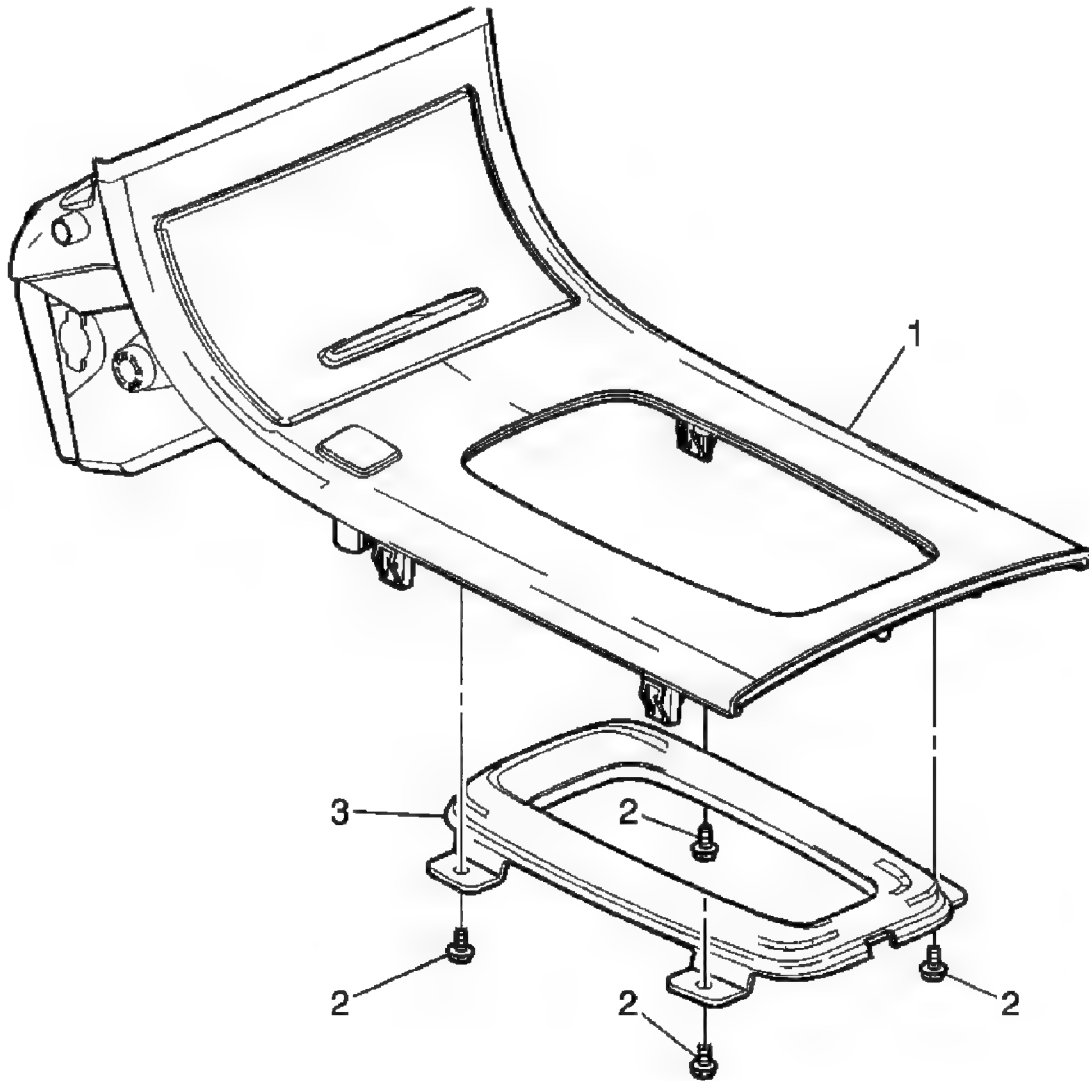


Fig. 46: Identifying Console Shift Lever Bezel
 Courtesy of GENERAL MOTORS CORP.

Console Shift Lever Bezel Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Front Floor Console Plate Assembly Refer to Front Floor Console Trim Plate Replacement .
2	Console Shift Bezel Bolts (Qty: 4) Tighten: 2 N.m (18 lb in)
3	Console Shift Bezel Assembly

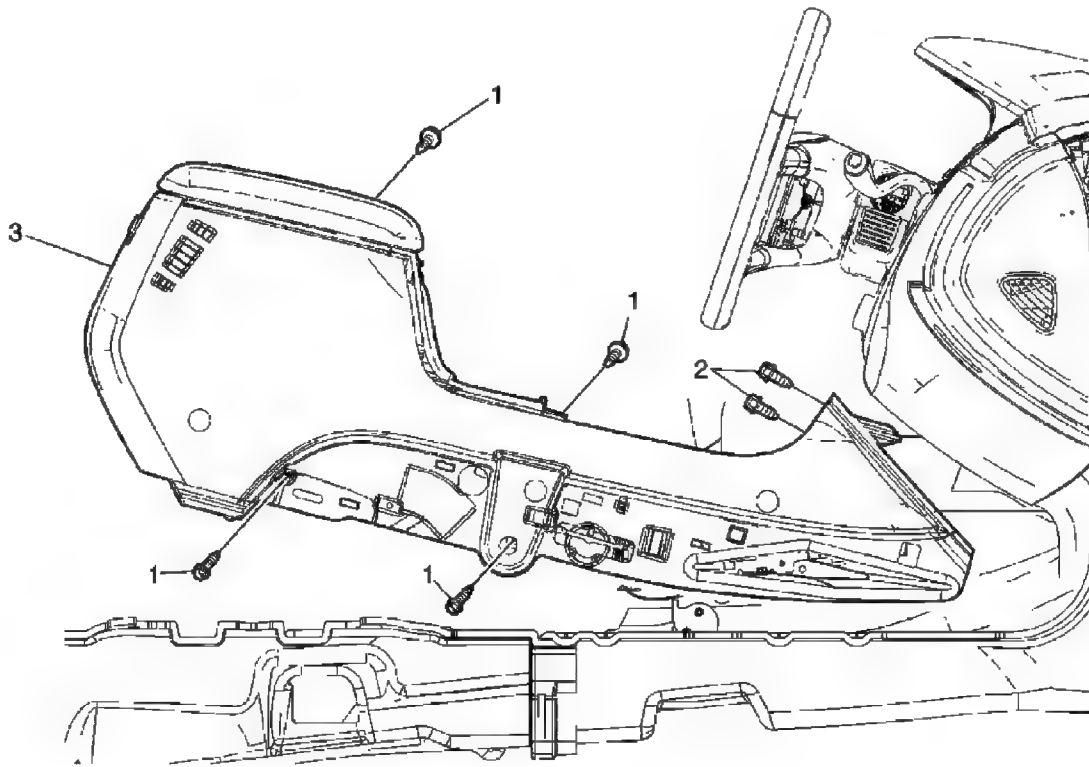
CONSOLE REPLACEMENT

Fig. 47: Removing/Installing Console
 Courtesy of GENERAL MOTORS CORP.

Console Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
Preliminary Procedures	
1. Remove the right and left console trim panels. Refer to <u>Front Floor Console Side Trim Panel Replacement - Right Side</u> and <u>Front Floor Console Side Trim Panel Replacement - Left Side</u> .	
2. Remove the front floor console trim plate. Refer to <u>Front Floor Console Trim Plate Replacement</u> .	
1	Bolt, Front Floor Console (Qty: 4) Tighten: 9 N.m (80 lb in)
	Screw, Front Floor Console (Qty: 2)

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2	Tighten: 2 N.m (18 lb in)
3	Console Assembly, Front Floor Console Tip: Disconnect the electrical connector.

FRONT FLOOR CONSOLE ARMREST REPLACEMENT

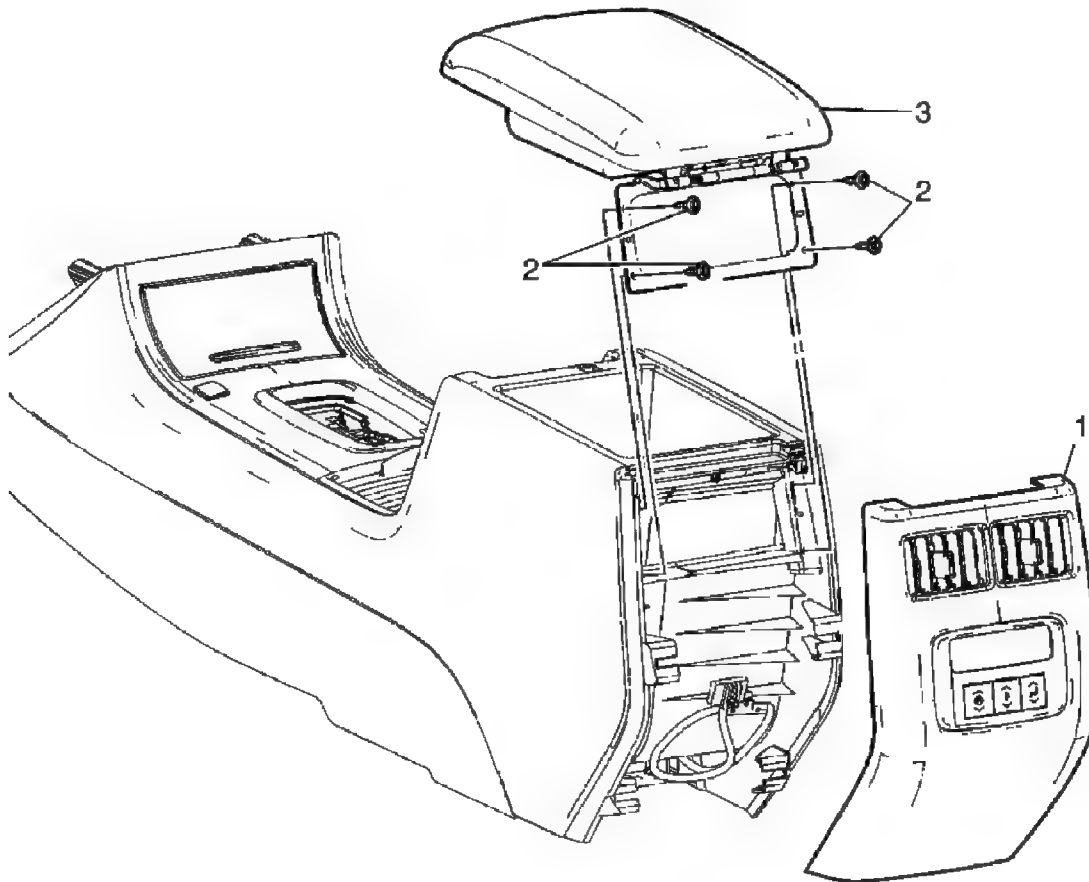


Fig. 48: View Of Console Armrest - Front Floor
Courtesy of **GENERAL MOTORS CORP.**

Front Floor Console Armrest Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Panel Assembly, Console End Refer to <u>Center Console End Panel Replacement</u>
2	Screw, Console Armrest Hinge (Qty: 4)

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	Tighten: 2 N.m (18 lb in)
3	Armrest Assembly, Front Floor Console

FRONT FLOOR CONSOLE ARMREST HINGE REPLACEMENT

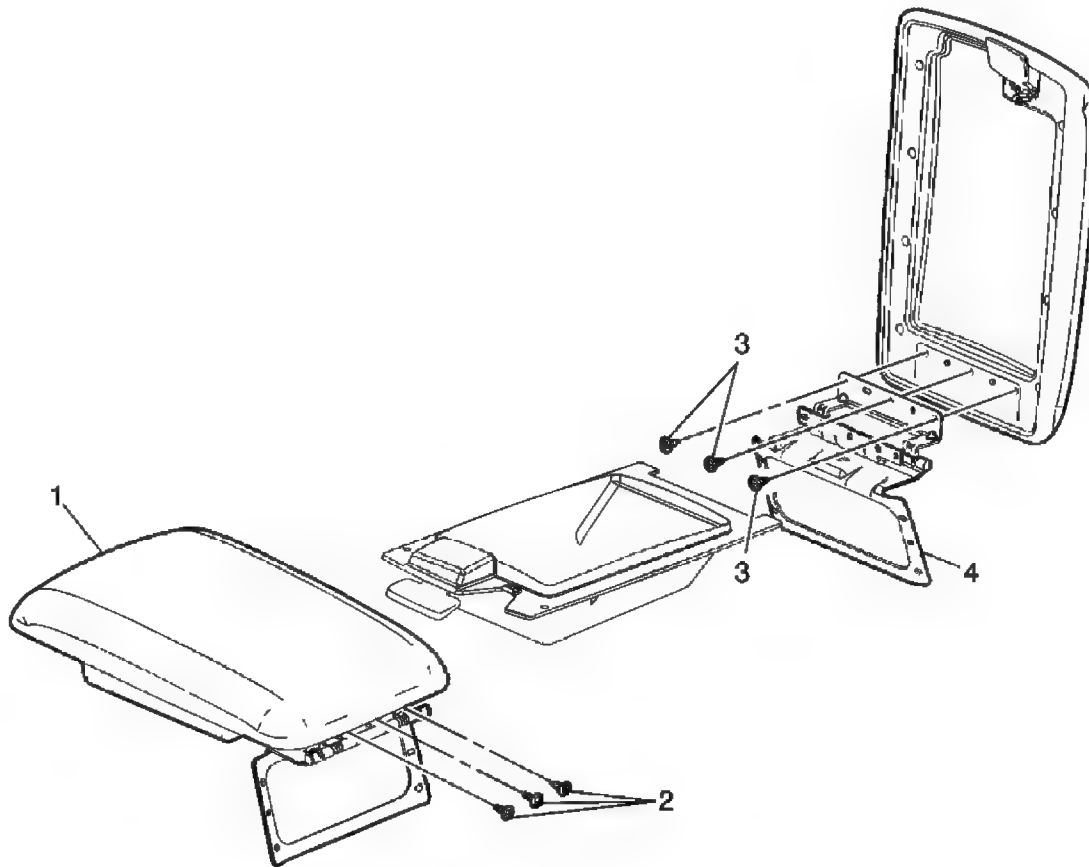


Fig. 49: View Of Hinge - Floor Console Arm Rest
Courtesy of GENERAL MOTORS CORP.

Front Floor Console Armrest Hinge Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Armrest Assembly, Front Floor Console Refer to <u>Front Floor Console Armrest Replacement</u>
2	Screw, Console Armrest Hinge (Qty: 3) Tighten: 2 N.m (18 lb in)
	Screw, Console Armrest Hinge (Qty: 3)

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3	Tighten: 2 N.m (18 lb in)
4	Hinge Assembly, Front Floor Console Armrest

FRONT FLOOR CONSOLE TRIM PLATE REPLACEMENT

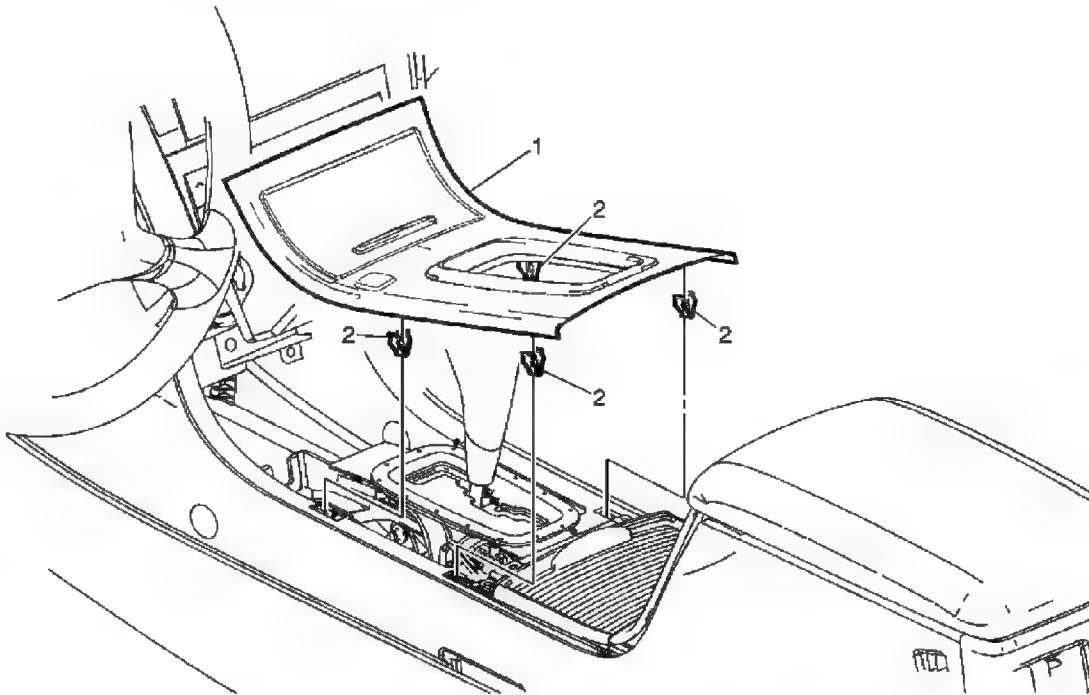


Fig. 50: Removing/Installing Trim Plate - Front Floor Console
Courtesy of GENERAL MOTORS CORP.

Front Floor Console Trim Plate Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Plate Assembly, Front Floor Console Tip: 1. Use a flat-bladed plastic trim tool to lift the rear edge of the console trim plate. 2. Disconnect the electrical connector.
2	Clip, Retainer (Qty: 4)

FRONT FLOOR CONSOLE CUP HOLDER REPLACEMENT

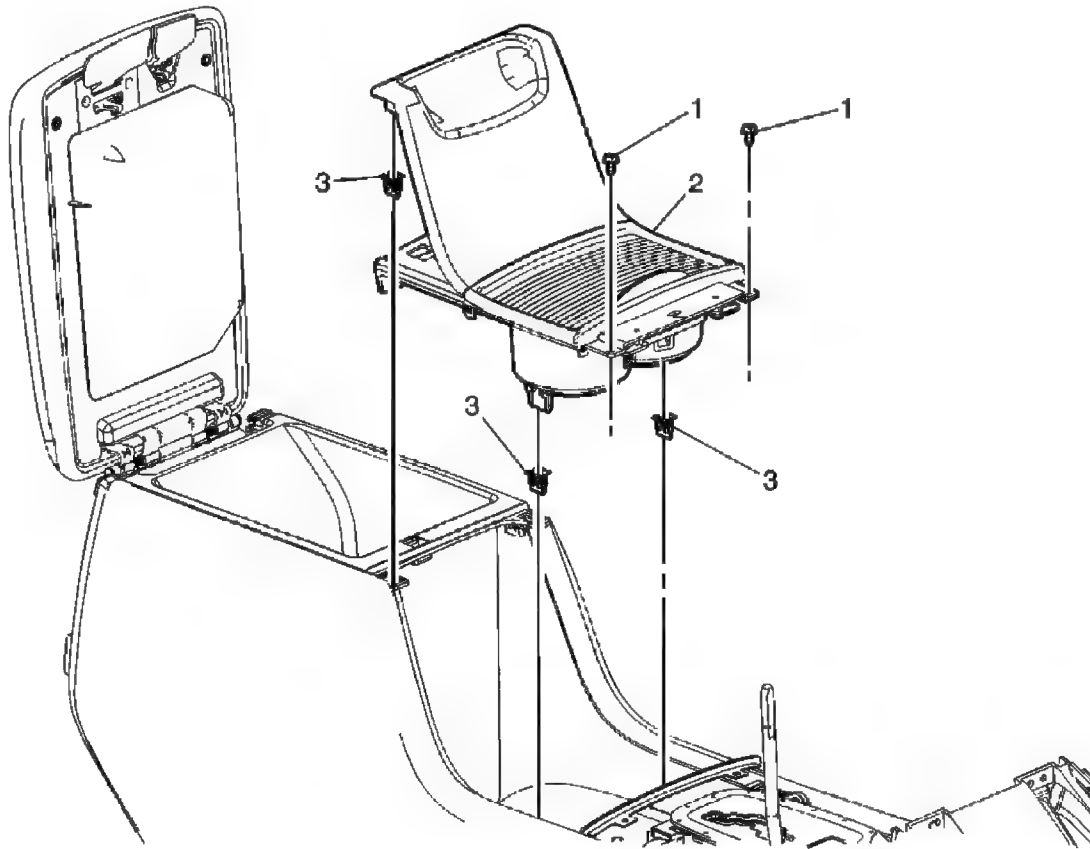


Fig. 51: Identifying Cupholder Replacement - Front Floor Console
 Courtesy of GENERAL MOTORS CORP.

Front Floor Console Cup Holder Replacement

Callout	Component Name
NOTE: Refer to <u>Fastener Notice</u> .	
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> . Preliminary Procedure: Remove the front floor console trim panel. Refer to <u>Front Floor Console Trim Plate Replacement</u> .	
1	Screw, Front Floor Console Cupholder (Qty: 2) Tighten: 2 N.m (18 lb in)
2	Cupholder Assembly, Front Floor Console
3	Clip, Retainer (Qty: 4)

CENTER CONSOLE END PANEL REPLACEMENT

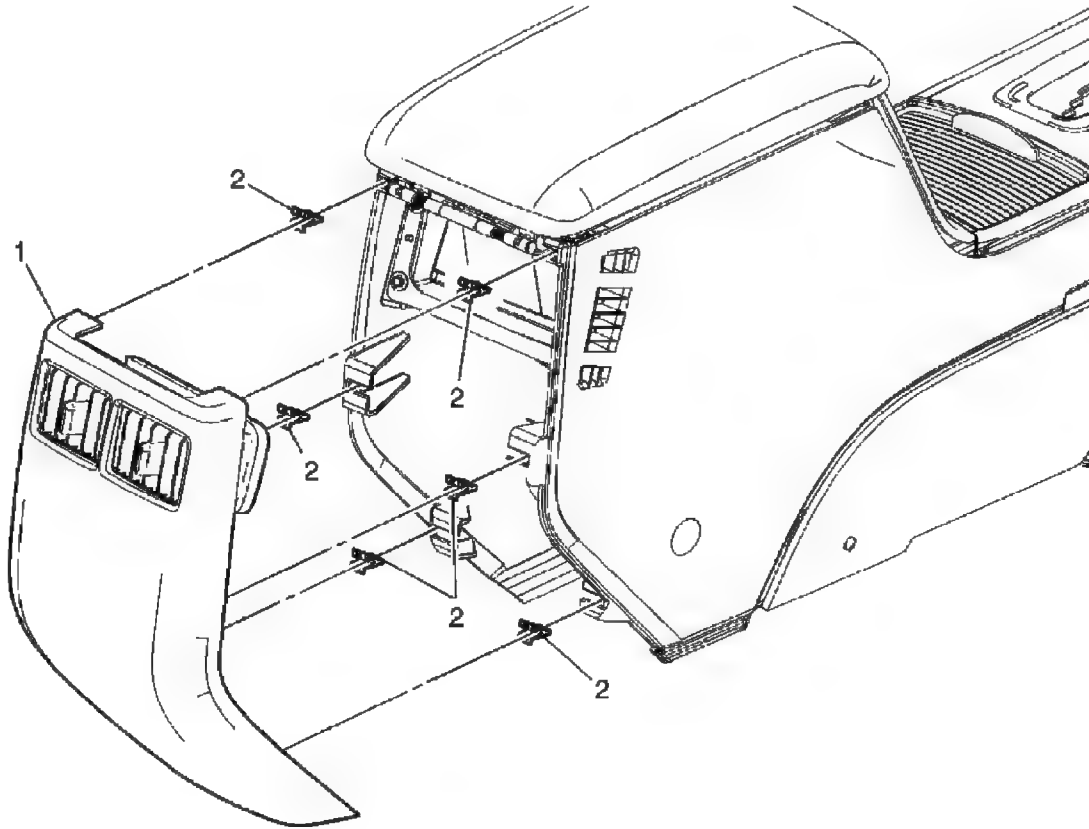


Fig. 52: View Of Center Console End Panel
 Courtesy of GENERAL MOTORS CORP.

Center Console End Panel Replacement

Callout	Component Name
Fastener Tightening Specifications: Refer to <u>Fastener Tightening Specifications</u> .	
1	Front Floor Console Rear Trim Panel Assembly
2	Retainer Clips (Qty: 6)

DESCRIPTION AND OPERATION

INSTRUMENT CLUSTER DESCRIPTION AND OPERATION

Displays Test

Certain instrument panel cluster (IPC) features are tested when the ignition is turned on in order to verify the features are working properly. The following occurs at key up:

- The air bag indicator flashes 7 times (not IPC controlled).
- The ABS indicator illuminates briefly.
- The battery Indicator illuminates briefly.

- The brake indicator illuminates briefly.
- The coolant temperature indicator.
- The engine oil pressure indicator illuminates briefly.
- The malfunction indicator lamp (MIL) illuminates briefly (not IPC controlled).
- The seat belt indicator illuminates for 70 seconds or until the driver seat belt is latched (not IPC controlled).
- The security indicator illuminates briefly.
- The tire pressure low indicator
- The vehicle dynamics caution (VDC) indicator
- All message center segments illuminate briefly.

Indicators and Warning Messages

Refer to **Indicator/Warning Message Description and Operation**.

Engine Coolant Temperature Gage

The instrument panel cluster (IPC) displays the engine coolant temperature as determined by the engine control module (ECM) or the powertrain control module (PCM). The IPC receives a serial data message from the ECM/PCM indicating the engine coolant temperature. The engine coolant temperature gage defaults to "°C" or below if:

- The ECM/PCM detects a malfunction in the engine coolant temperature sensor circuit.
- The IPC detects a loss of serial data communications with the ECM/PCM.
- The body control module (BCM) detects a loss of serial data communications with the ECM/PCM.
- The IPC detects a loss of serial data communications with the BCM.

Fuel Gage

The instrument panel cluster (IPC) displays the fuel level as determined by the engine control module (ECM)/powertrain control module (PCM). The IPC receives a serial data message from the ECM/PCM indicating the fuel level percent. The fuel gage defaults to empty if:

- The ECM/PCM detects a malfunction in the fuel level sensor circuit.
- The IPC detects a loss of serial data communications with the ECM/PCM.
- The IPC detects a loss of serial data communications with the body control module (BCM).

When the fuel level is less than a pre-determined value, the low fuel message is displayed in the DIC.

Odometer

The instrument panel cluster (IPC) contains a season odometer and trip odometer A or B in the trip/fuel switch menu. Momentarily press the trip/fuel switch in order to cycle through the trip/fuel menu. Press the set/reset switch momentarily, while a trip odometer is displayed, in order to reset the trip odometer. Pressing the set/reset switch for 2 seconds will reset a trip odometer. The vehicle mileage and trip mileage is displayed as determined by the IPC. The IPC calculates the mileage based on the serial data vehicle speed information from the ECM/PCM. The IPC receives the vehicle odometer information from the body control module (BCM) via the serial data circuit. The odometer will display 'error' if an internal IPC memory failure is detected. The odometer displays either miles or kilometers as requested through the DIC Vehicle Information Menu.

PRNDL Display

The instrument panel cluster (IPC) displays the selected gear position as determined by the engine control module (ECM)/powertrain control module (PCM). The IPC receives a serial data message from the ECM/PCM indicating the gear position. The PRNDL displays blank if:

- The ECM/PCM detects a malfunction in the transmission range switch circuit.
- The IPC detects a loss of serial data communication with the ECM/PCM.
- The IPC detects a loss of serial data communication with the body control module (BCM).

Speedometer

The instrument panel cluster (IPC) displays the vehicle speed as determined by the engine control module (ECM)/powertrain control module (PCM). The IPC receives vehicle speed information from the body control module (BCM) via serial data messages. The speedometer defaults to 0 km/h (0 mph) when the IPC detects a loss of serial data communication with the ECM/PCM or the BCM.

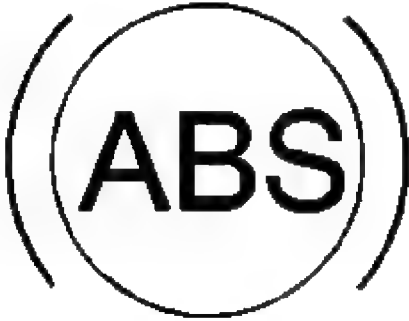

Tachometer

The instrument panel cluster (IPC) displays the engine speed as determined by the engine control module (ECM)/powertrain control module (PCM). The IPC receives a serial data message from the engine control module (ECM)/powertrain control module (PCM) indicating the engine speed. The IPC receives engine speed information from the body control module (BCM) via serial data messages. The tachometer will default to 0 RPM if:

- The ECM/PCM detects a malfunction in the engine speed signal circuit.
- The IPC detects a loss of serial data communication with the ECM/PCM.
- The IPC detects a loss of serial data communication with the BCM.

INDICATOR/WARNING MESSAGE DESCRIPTION AND OPERATION

IPC Indicators

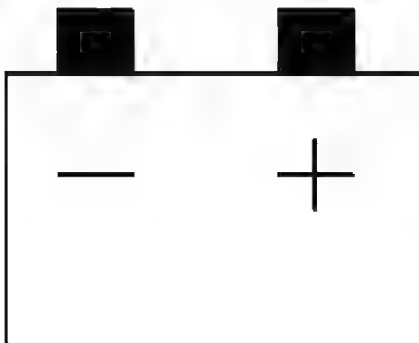
Symbol	Description
	ABS: Refer to <u>ABS Description and Operation</u>
	Air Bag: Refer to <u>SIR System Description and Operation</u>
	Brake: Refer to <u>Brake Warning System Description and Operation</u>

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(Export)
BRAKE (Domestic)

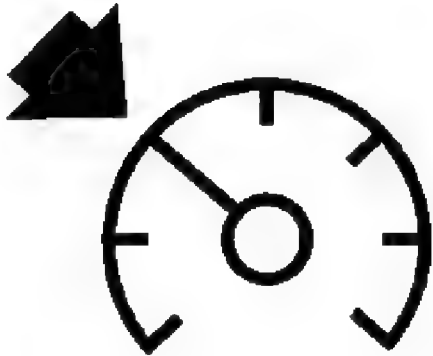


Charge: Refer to **Charging System
Description and Operation**

Cruise: Refer to **Cruise Control
Description and Operation (3.8L)** or
**Cruise Control Description and
Operation (4.6L)**

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Engine Coolant Temperature: Refer to
**Cooling System Description and
Operation**



Engine Oil Pressure: Refer to
**Indicator/Warning Message Description
and Operation.**



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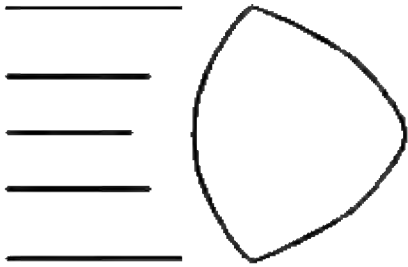
Fasten Safety Belt: Refer to **Seat Belt System Description and Operation**



Front Fog Lamps: Refer to **Exterior Lighting Systems Description and Operation**

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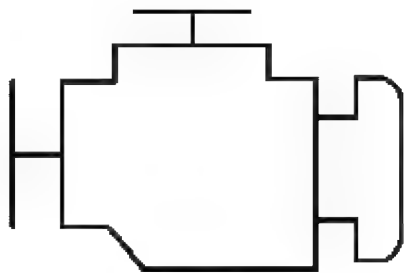
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High Beam: Refer to **Exterior Lighting Systems Description and Operation**

km/h

km/h: Refer to **Indicator/Warning Message Description and Operation.**



Malfunction Indicator Lamp (MIL): Refer to **Engine Control Module Description** for the 4.6L engine or to **Powertrain Control Module Description** for the 3.8L engine

MPH

MPH: Refer to **Indicator/Warning Message Description and Operation.**

Security: Refer to **Vehicle Theft Deterrent (VTD) Description and Operation** or **Content Theft Deterrent (CTD) Description and Operation**

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Tire Pressure Low: Refer to **Tire Pressure Monitor Description and Operation**



Turn Signals: Refer to **Exterior Lighting Systems Description and Operation**

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VDC: Refer to **ABS Description and Operation**

DIC Warning Messages

Symbol	Description
AUTOMATIC LIGHT CONTROL OFF	Refer to <u>Exterior Lighting Systems Description and Operation</u>
AUTOMATIC LIGHT CONTROL ON	Refer to <u>Exterior Lighting Systems Description and Operation</u>
BUCKLE PASSENGER SEAT BELT	Refer to <u>Seat Belt System Description and Operation</u>
BUCKLE SEATBELT	Refer to <u>Seat Belt System Description and Operation</u>
CALIBRATING: DRIVE IN CIRCLES	Refer to <u>Electronic Compass Calibration</u>
CALIBRATION COMPLETE	Refer to <u>Electronic Compass Calibration</u>
CHANGE ENGINE OIL SOON	Refer to <u>Indicator/Warning Message Description and Operation</u> .
CHECK LEFT FRONT TIRE PRESSURE (if equipped)	Refer to <u>Tire Pressure Monitor Description and Operation</u>
CHECK LEFT REAR TIRE PRESSURE (if equipped)	Refer to <u>Tire Pressure Monitor Description and Operation</u>
CHECK RIGHT FRONT TIRE PRESSURE (if equipped)	Refer to <u>Tire Pressure Monitor Description and Operation</u>

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CHECK RIGHT REAR TIRE PRESSURE (if equipped)	Refer to <u>Tire Pressure Monitor Description and Operation</u>
CLEAN REAR BUMPER	Refer to <u>Object Detection Description and Operation (Rear Park Assist)</u>
COOLANT LEVEL LOW ADD COOLANT	Refer to <u>Cooling System Description and Operation</u>
DRIVER DOOR OPEN	Refer to <u>Door Ajar Indicator Description and Operation</u>
ENGINE HOT TURN A/C OFF	Refer to <u>Cooling System Description and Operation</u>
ENGINE OIL LOW ADD OIL	Refer to <u>Indicator/Warning Message Description and Operation.</u>
ENGINE OVERHEATED IDLE ENGINE	Refer to <u>Cooling System Description and Operation</u>
ENGINE OVERHEATED STOP ENGINE	Refer to <u>Cooling System Description and Operation</u>
ENGINE POWER REDUCED	Refer to <u>Throttle Actuator Control (TAC) System Description</u> for the 4.6L engine or <u>Throttle Actuator Control (TAC) System Description</u> for the 3.8L engine
FUEL LEVEL LOW	Refer to <u>Indicator/Warning Message Description and Operation.</u>
HOOD OPEN	Refer to <u>Content Theft Deterrent (CTD) Description and Operation</u>
HEATING WASH FLUID WASH WIPES PENDING	Refer to <u>Wiper/Washer System Description and Operation (Wipers and Washers)</u> or <u>Wiper/Washer System Description and Operation (Heated Washer System)</u>
HEATED WASH FLUID SYSTEM OFF	Refer to <u>Wiper/Washer System Description and Operation (Wipers and Washers)</u> or <u>Wiper/Washer System Description and Operation (Heated Washer System)</u>
ICE POSSIBLE	Refer to <u>Indicator/Warning Message Description and Operation.</u>
LEFT REAR DOOR OPEN	Refer to <u>Door Ajar Indicator Description and Operation</u>
	Refer to <u>Indicator/Warning Message</u>

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OIL PRESSURE LOW STOP ENGINE	<u>Description and Operation.</u>
PARK ASSIST OFF	Refer to <u>Object Detection Description and Operation (Rear Park Assist)</u>
PASSENGER DOOR OPEN	Refer to <u>Door Ajar Indicator Description and Operation</u>
RAINSENCE WIPERS ACTIVE	Refer to <u>Wiper/Washer System Description and Operation (Wipers and Washers)</u> or <u>Wiper/Washer System Description and Operation (Heated Washer System)</u>
REMOTE KEY LEARNING ACTIVE	Refer to <u>Keyless Entry System Description and Operation</u>
REPLACE BATTERY IN REMOTE KEY	Refer to <u>Keyless Entry System Description and Operation</u>
RIGHT REAR DOOR OPEN	Refer to <u>Door Ajar Indicator Description and Operation</u>
SERVICE A/C SYSTEM	Refer to <u>A/C Air Temperature Description and Operation</u>
SERVICE AIR BAG	Refer to <u>SIR System Description and Operation</u>
SERVICE BATTERY CHARGING SYSTEM	Refer to <u>Charging System Description and Operation</u>
SERVICE BRAKE SYSTEM	Refer to <u>Brake Assist System Description and Operation</u>
SERVICE BRAKE ASSIST	Refer to <u>Brake Assist System Description and Operation</u>
SERVICE PARK ASSIST	Refer to <u>Object Detection Description and Operation (Rear Park Assist)</u>
SERVICE POWER STEERING	Refer to <u>Power Steering System Description and Operation (w/o Electro-Hydraulic Steering)</u>
SERVICE STABILITRAK	Refer to <u>ABS Description and Operation</u>
SERVICE SUSPENSION SYSTEM	Refer to <u>Front Suspension Description and Operation</u> or <u>Rear Suspension Description and Operation</u>
SERVICE THEFT SYSTEM	Refer to <u>Vehicle Theft Deterrent (VTD) Description and Operation</u> or <u>Content Theft Deterrent (CTD) Description and Operation</u>

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SERVICE TRACTION CONTROL	Refer to <u>ABS Description and Operation</u>
SERVICE TRANSMISSION	Refer to <u>Transmission Indicators and Messages</u>
SERVICE VEHICLE SOON	Refer to <u>Indicator/Warning Message Description and Operation.</u>
SPEED LIMITED TO XXX	Refer to <u>Cruise Control Description and Operation (3.8L)</u> or <u>Cruise Control Description and Operation (4.6L)</u>
STABILITRAK NOT READY	Refer to <u>ABS Description and Operation</u>
STABILITRAK OFF	ABS: Refer to <u>ABS Description and Operation</u>
STARTING DISABLED SERVICE THROTTLE	Refer to <u>Throttle Actuator Control (TAC) System Description</u> for the 4.6L engine or <u>Throttle Actuator Control (TAC) System Description</u> for the 3.8L engine
THEFT ATTEMPTED	Refer to <u>Vehicle Theft Deterrent (VTD) Description and Operation</u> or <u>Content Theft Deterrent (CTD) Description and Operation</u>
TIGHTEN GAS CAP	Refer to <u>Indicator/Warning Message Description and Operation.</u>
TIRE PRESSURE SYSTEM RESET	Refer to <u>Tire Pressure Monitor Description and Operation</u>
TRACTION CONTROL OFF	Refer to <u>ABS Description and Operation</u>
TRANS HOT IDLE ENGINE	Refer to <u>Transmission Indicators and Messages</u>
TRUNK OPEN	Refer to <u>Luggage Compartment Description and Operation</u>
TURN SIGNAL ON	Refer to <u>Exterior Lighting Systems Description and Operation</u>
WAIT TO START	Refer to <u>Vehicle Theft Deterrent (VTD) Description and Operation</u> or <u>Content Theft Deterrent (CTD) Description and Operation</u>
WASHER FLUID LOW ADD FLUID	Refer to <u>Wiper/Washer System Description and Operation (Wipers and Washers)</u> or <u>Wiper/Washer System Description and Operation (Heated Washer System)</u>

CHANGE ENGINE OIL

The driver information center (DIC) displays the CHANGE ENGINE OIL SOON message when the engine control module (ECM) determines that the engine oil life drops below 5 percent. The ECM sends a GMLAN message to the instrument panel cluster (IPC) requesting the CHANGE ENGINE OIL display. After the oil is changed, reset the engine oil monitor. Refer to **GM Oil Life System Resetting**. Refer to the following before adding or changing engine oil:

- When the Low Engine Oil Level/Change Engine Oil Soon indicator displays in the IPC or DIC due to a low engine oil level condition, make sure that the ignition is turned OFF before adding or changing the oil in the vehicle. Failure to do so may result in the Low Engine Oil Level/Change Engine Oil Soon message staying on after the engine attains proper oil level.
- Before replacing the IPC because of the Low Engine Oil Level/Change Engine Oil Soon staying ON after an oil change or engine oil addition, it is necessary for the engine to undergo a thermocycle process. The IPC may not be malfunctioning but only needs the Low Engine Oil Level/Change Engine Oil Soon to turn off. After the oil is changed, reset the engine oil monitor. Refer to **GM Oil Life System Resetting**

Engine Oil Pressure

The ECM monitors the engine oil pressure sensor signal circuit to determine the engine oil pressure. When the engine oil pressure is high, the EOP sensor voltage is high and the ECM senses a high signal voltage. When the engine oil pressure is low, the EOP sensor voltage is low and the ECM/PCM senses a low signal voltage. The ECM sends the EOP information to the instrument panel cluster (IPC) via GMLAN serial data message. The instrument panel cluster (IPC) receives a GMLAN message requesting display of the engine oil pressure indicator from the ECM.

ICE POSSIBLE

The driver information center (DIC) displays ICE POSSIBLE DRIVE WITH CARE for 10 seconds when the HVAC module determines that the outside air temperature has dropped below 2.0°C (36°F). The instrument panel cluster (IPC) receives a GMLAN message from the HVAC module to display the message.

km/h and MPH**km/h**

The instrument panel cluster (IPC) displays the km/h indicator when the cluster detects that Metric units have been requested.

MPH

The IPC displays the MPH indicator when the cluster detects that English units have been requested.

FUEL LEVEL LOW

The driver information center (DIC) displays FUEL LEVEL LOW when the instrument panel cluster (IPC) determines that the fuel level is less than 10.98 percent. The IPC receives a GMLAN message indicating the fuel level information from the engine control module (ECM).

ENGINE OIL LOW

The driver information center (DIC) displays ENGINE OIL LOW ADD OIL when the engine control module (ECM) detects a low engine oil level condition from the engine oil level sensor/switch. The instrument panel cluster (IPC) receives a GMLAN message indicating a low engine oil level condition. Refer to **GM Oil Life System Resetting** . Refer to the following before adding or changing engine oil:

- When the Low Engine Oil Level/Change Engine Oil Soon indicator displays in the IPC or DIC due to a low engine oil level condition, make sure that the ignition is turned OFF before adding or changing the oil in the vehicle. Failure to do so may result in the Low Engine Oil Level/Change Engine Oil Soon message staying on after the engine attains proper oil level.
- Before replacing the IPC because of the Low Engine Oil Level/Change Engine Oil Soon staying ON after an oil change or engine oil addition, it is necessary for the engine to undergo a thermocycle process. The IPC may not be malfunctioning but only needs the Low Engine Oil Level/Change Engine Oil Soon to turn off. After the oil is changed, reset the engine oil monitor. Refer to **GM Oil Life System Resetting** .

OIL PRESSURE LOW

The driver information center (DIC) displays OIL PRESSURE LOW STOP ENGINE when the engine control module (ECM) detects low engine oil pressure condition from the engine oil pressure (EOP) sensor/switch. The instrument panel cluster (IPC) receives a GMLAN message requesting display of the indicator from the ECM.

SERVICE VEHICLE SOON

The driver information center (DIC) displays SERVICE VEHICLE SOON when the engine control module (ECM) detects certain malfunctions that are not related to the emissions system. The instrument panel cluster (IPC) receives a GMLAN message requesting illumination through the BCM

TIGHTEN GAS CAP

The driver information center (DIC) displays TIGHTEN GAS CAP when the fuel tank cover is not tight. The IPC receives a GMLAN message indicating the fuel tank cover needs to be tightened.

DRIVER INFORMATION CENTER (DIC) DESCRIPTION AND OPERATION

The driver information center (DIC) displays the DIC WOW for 5 seconds when it first powers up. The DIC returns to the last display status before no power condition.

There are 4 switch functions for the DIC.

- Trip/Fuel
- Vehicle Information
- Customization (Personalization)
- Set/Reset

Trip/Fuel

The trip/fuel switch is used to navigate between vehicle fuel information parameters. Cycle through the following vehicle parameters by successive pressing of the trip/fuel switch.

- Blank Display
- Average Fuel Economy (AFE)
- Average Vehicle Speed (AVS)
- Fuel Range
- Instantaneous Fuel Economy (IFE)
- Odometer
- Trip A
- Trip B

Vehicle Information

- Blank Display
- English/Metric Units
- Key Fob Programming Menu (Relearn Remote Key)
- Engine Oil Life Remaining
- Park Assist Menu
- Tire Inflation Monitoring System (TIMS) Reset (Relearn Tire Position)
- Compass Zone Setting (if equipped)
- Compass Calibration (if equipped)
- Key Fob Programming Menu (only available in part)

Customization (Personalization)

- Display Language
- Automatic Door Lock
- Automatic Door Unlock
- Remote Door Lock
- Remote Door Unlock
- Exit Lighting (time)
- Approach Lighting
- Chime Volume
- Park Tilt Mirrors
- Easy Exit Seat
- Memory Seat Recall
- Remote Start
- Restore Factory Settings
- Exit Feature Settings

Set/Reset

Press the Set/Reset button on order to set or acknowledge any of the switch menu options.

Average Fuel Economy

Average fuel economy is calculated using the equation: $AFE = \text{Distance} / \text{Fuel}$

- Distance = The accumulated distance travelled since the last reset of this value
- Fuel = The accumulated fuel consumption since the last reset of this value

The engine control module (ECM) sends the distance and fuel economy message to the instrument panel cluster (IPC) for accumulation. The value of this mode is retained during ignition OFF and can be changed between English units and metric units by selecting from the Vehicle Information menu.

Average Speed

Average speed is calculated using the equation: $\text{Average Speed} = \text{AVS Distance} / \text{AVS Time}$

- Distance = The accumulated distance travelled since the last reset of this value
- Ignition On = The accumulated ignition on time since the last reset of this value

Fuel Range

This message indicates the estimated distance that the vehicle can travel under the current fuel economy and fuel level conditions since the last battery connection to the IPC. Fuel Range is calculated using the equation: $\text{Fuel Range} = \text{Range Distance} / \text{Range Fuel Used}$.

- Range Distance = The accumulated distance travelled since the last reset of this value.
- Fuel Used = The accumulated fuel delivered since the last reset of this value

The ECM sends the fuel range value to the IPC. The fuel range value is retained during ignition OFF and can be changed between English and Metric units by accessing the Vehicle Information menu. The Fuel Range display cannot be reset. LOW is displayed when fuel range is below a predetermined value.

Engine Oil Life Remaining

The engine control module (ECM) sends the engine oil life remaining percentage to the instrument panel cluster (IPC) via a GMLAN serial data message for display. When the ECM detects that the oil life remaining percentage drops below 5 percent, it sends the IPC a GMLAN message to display CHANGE ENGINE OIL SOON. When the engine oil is changed, reset the GM Oil Life System. Refer to **GM Oil Life System Resetting**.

Tire Pressure Monitor

The instrument panel cluster (IPC) receives a GMLAN message from the tire pressure monitoring (TPM) system for the front and rear tire pressure. The driver information center (DIC) will display the pressure for each of the front and rear tires. When a tire with low air pressure is present, the DIC displays XX TIRE PRESSURE LOW.

Reset Tire Pressure System

Press the vehicle information button until PRESS TO RESET TIRE SYSTEM displays. This display allows you to reset the tire pressure system. Once in this display, press the set/reset button to reset the system. The message TIRE PRESSURE SYSTEM RESET will display after the system has been reset.

Park Assist Menu

The park assist menu is displayed in the DIC. The DIC displays the current state of the park assist - ON/OFF. The IPC receives a serial data message indicating the state of the park assist system. The DIC displays (- - -) when communication with the park assist system is lost.

English/Metric Button

The English/Metric button is used to toggle between English and Metric unit system and can be accessed through the Vehicle Information switch function.

Trip A/B

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The trip odometer A or B can be accessed through the Trip/Fuel information switch.

Trip Display

DIC Trip Display	Range	
	Metric	English
ODOMETER	#####km	#####MI
TRIP A	####.#km	####.#MI
TRIP B	####.#km	####.#MI

Language

The DIC is capable of displaying in 3 languages:

- English
- French
- Spanish

A simultaneous press of the Vehicle Information switch and the Customization (Personalization) switch for about 2 second provides a shortcut to change the language without understanding the currently displayed language.

Compass

The DIC displays the compass information on the right most 2 characters of the first DIC line when the compass is an option on the vehicle. When corresponding to the true north radial degrees, the compass displays the following directions

Compass Display

Radial Degree (True North)	Compass Direction
337.5 to 22.5	N
22.5 to 67.5	NE
67.5 to 112.5	E
112.5 to 157.5	SE
157.5 to 202.5	S
247.5 to 292.5	W

Outside Air Temperature

The driver information center (DIC) displays the outside air temperature based on GMLAN message from the HVAC controller. The outside air temperature can be displayed in English or Metric systems from the Vehicle Information menu. The DIC displays (- - -) when an invalid outside air temperature is received or communication is lost with the HVAC controller.

AUDIBLE WARNINGS DESCRIPTION AND OPERATION

The audible warnings alert the driver of a system concern or a critical vehicle condition. The audio amplifier generates the audible warnings through the left front speaker. The audio amplifier receives audible warning requests via the serial data circuit. If the audio amplifier receives multiple audible warning requests, the warning with the highest priority sounds first. The following lists the audible warning priority and the pulse rate:

1. Fast rate chime-200 pulses per minute
2. Medium rate chime-150 pulses per minute
3. Slow rate chime-50 pulses per minute
4. Single chime

Fasten Safety Belt Warning

The audio amplifier activates the fasten safety belt audible warning as requested by the body control module (BCM). The BCM sends a serial data message to the audio amplifier indicating the chime frequency and duration of 8 seconds. The fasten safety belt warning sounds and the fasten safety belt indicator illuminates when the following occurs:

- The ignition switch transitions to ON.
- The inflatable restraint sensing and diagnostic module (SDM) detects that the driver's seat belt is not buckled and the signal is low. The SDM sends a serial data message to the BCM indicating the seat belt status. The instrument panel cluster (IPC) receives a serial data message from the BCM indicating the driver seat belt status.

If the seat belt is buckled when the ignition is turned ON, the chime does not sound. If the seat belt is buckled while the chime is sounding, the chime stops. If the seat belt is unbuckled after the initial transition to ON, the chime does not sound.

Lights On Warning

The audio amplifier activates the lights on warning as requested by the body control module (BCM). The BCM sends a serial data message to the audio amplifier indicating the chime frequency of a fast rate and at a continuous duration. The lights on warning sounds when the following occurs:

- The ignition is OFF.
- The BCM determines that the driver door is open and the signal circuit is low.
- The BCM determines that the headlamp switch is in the park or head position.

Brake Warning

The audio amplifier activates the brake audible warning as requested by the instrument panel

cluster (IPC). The IPC sends a serial data message to the audio amplifier indicating the chime frequency of a fast rate and at a continuous duration. The brake warning sounds and the BRAKE indicator illuminates when the following occurs:

- The ignition is ON.
- The vehicle speed is greater than 8 km/h (4.9 mph). The IPC receives a serial data message from the engine control module (ECM) indicating the vehicle speed.
- The IPC determines that the park brake is engaged and the signal circuit is low.
- The brake fluid is low.
- The dynamic rear proportioning (DRP) failed

Key-In-Ignition Warning

The audio amplifier activates the key-in-ignition audible warning as requested by the body control module (BCM). The BCM sends a serial data message to the radio indicating the chime frequency of a medium rate and continuous duration. The key-in-ignition warning sounds when the following occurs:

- The ignition switch is OFF.
- The BCM determines that the driver door is open and the signal circuit is low. The instrument panel cluster (IPC) receives a serial data message from the BCM indicating the door ajar status
- The BCM determines that the key-in-ignition switch is open and the signal circuit is high. The IPC receives a serial data message from the BCM indicating the key-in-ignition status.

Door Ajar Warning

The audio amplifier activates the door ajar audible warning as requested by the body control module (BCM). The BCM sends a serial data message to the radio indicating the chime frequency of a medium rate and continuous duration. The door ajar warning sounds and the door ajar indicator illuminates when the following occurs:

- The BCM determines that the driver door is open and the signal circuit is low. The instrument panel cluster (IPC) also receives a serial data message from the BCM requesting illumination of the door ajar indicator.
- The vehicle is not in PARK. The BCM receives a serial data message from the ECM or BCM indicating the gear position.

Additional Warnings

The following warnings have an associated instrument panel cluster (IPC) indicator:

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- Hot coolant temperature-The audio amplifier activates the audible warning as requested by the BCM or ECM/PCM. The BCM sends a serial data message to the audio amplifier indicating the chime frequency of a medium rate and at a continuous duration.
- Low fuel-The audio amplifier activates the audible warning as requested by the BCM. The BCM sends a serial data message to the audio amplifier indicating the chime frequency of a medium rate and at a continuous duration.
- Low engine oil pressure-The audio amplifier activates the audible warning as requested by the IPC. The BCM sends a serial data message to the audio amplifier indicating the chime frequency of a medium rate and at a continuous duration. The low engine oil pressure indicator should be ON in the IPC.

Refer to Indicator/Warning Message Description and Operation.

SPECIAL TOOLS AND EQUIPMENT

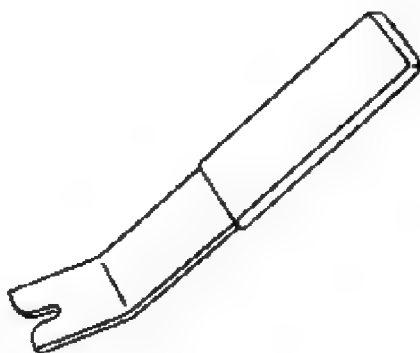
SPECIAL TOOLS

Special Tools

Illustration	Tool Number/Description
	J 35616-A Connector Test Adapter Kit
	J 33431-C Signal Generator and Instrument Panel Tester

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J 38778
Door Trim Pad Clip Remover

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